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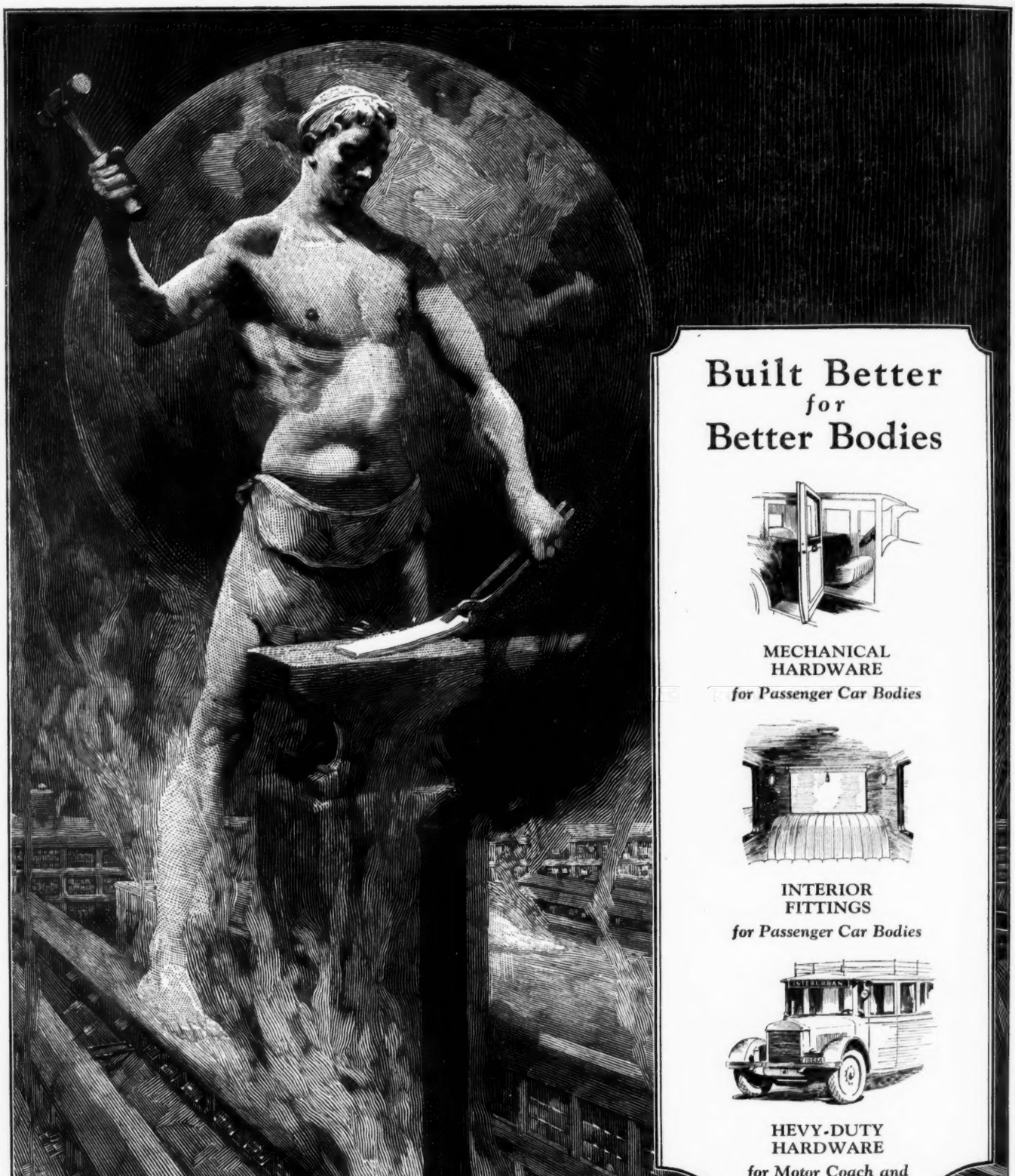

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AUTOMOTIVE INDUSTRIES
VOLUME 52 New York, Thursday, April 2, 1925 NUMBER 14

Industry Shifting Into High as First Quarter Ends

Situation generally is satisfactory. Some factories operating full, others at 90 per cent. Sales leading 1924.

By John C. Gourlie

News Editor Class Journal Co.

A SURVEY of the situation in automobile production and sales in twenty-five key cities at the end of the first quarter and at the outset of the Spring buying season discloses the following facts:

1. Production schedules at many factories are running over 90 per cent of capacity and a few are utilizing their complete facilities.

2. March production was about 15 per cent over February's mark, running between 310,000 and 320,000.

3. In most sections of the country sales are somewhat better than they were at this period last year.

4. All factors considered, the outlook is for a prosperous year for the industry, though not a record-breaking one.

Tempered optimism characterizes the present sentiment of the automobile trade. It is realized that 1925 is a year of readjustment, when new policies affecting production and sales are being put to the test, and that the final accounting of gains and losses at the end of the year is to a large extent unpredictable.

But the strongly intrenched companies have nothing to fear in the immediate future, and they appear to be destined to come out of the trial period stronger than ever.

Current sales reports are almost unanimously favorable. The Eastern section of the United States enjoyed exceptionally fine weather during March, and many persons who might have held off buying until later were tempted to enter the market. In other sections mild days did not appear until late in the month, but the reaction to the first hesitant appearance of spring was the same. In compliance with the demand, production was speeded during the month and night shifts were put on in a few factories, though by no means all of the producers have yet reached capacity.

Manufacturers are making greater efforts than the dealers to anticipate the demand for cars at the peak of the buying season.

Despite the favorable outlook, dealers with few exceptions are buying only for their immediate needs. This hand-to-mouth condition is new to the automobile industry and it will be interesting to note how it turns out. One almost certain consequence of the retailers' present attitude is that shortages will appear in some lines in May or June, even though total sales for the year may be considerably below the capacity of the industry.

In urging caution in advance purchases on their dealers, the manufacturers did not mean to discourage all stocking against anticipated demand. It appears that the advice from the factories, fundamentally sound as it undoubtedly was, has been taken too literally by the dealers who now are under-stocked, instead of over-stocked as was the case a year ago.

The immediate sufferer in this situation is the distributor. Some of the wholesale concerns, it is known, are temporarily embarrassed by large stocks of cars that dealers have declined

WALL STREET again is rife with rumors of new mergers in the automotive field.

While these rumors are not, perhaps, uniformly without foundation, the fact remains that any actual consolidations are likely to be few and far between, and their consummation will be the result of prolonged preparation and negotiations.

The possible exception is Dodge and the several other important motor companies which have been associated with it in the current merger reports.

A great restraining factor in the merger situation is that a large proportion of the strong companies are still controlled by men who have grown up with the industry, who have pride in their product, and who are unwilling to lose their independent position.

to take off their hands, but the condition is not regarded as serious, and is, in fact, already in process of being cleared up.

The used car situation is spotty. Some cities report that stocks are low and turnover good, but others find all the old sources of complaint and difficulty. One thing is certain, however, a considerable proportion of the dealers have learned that they cannot expect to survive and prosper if used car business is handled at a loss. A large majority of the dealer eliminations of last year can be traced to this source.

At least one producer, Henry Ford, has made a radical effort to solve the used car problem. He has told his dealers that used car turnover ought to show a profit and that if they are not willing to conduct business on this basis they are not desirable as agents for his cars. He requires reports on allowances and sales as a check upon the dealers' operations. The results of this drastic move will be followed with intense interest, for in such a policy may lie the beginning of a revolution in present methods of merchandising automobiles.

Time Sales on Increase

Time sales are on the increase. Various factors are at work to extend selling on deferred payments, among them being the ease of financing the purchase and the disposition of salesmen to use the time feature as the clinching argument to the prospect, who in many instances otherwise might be willing to pay cash. Payments are coming in about as usual and no gain in repossessions is noted.

Accessory and equipment manufacturers who specialize in replacements are having a good season, but those who sell mainly to car producers report business as somewhat below the level of last year at this time.

Tire manufacturers are doing a large business and they look for a record-breaking year. There is considerable discussion of the price situation and the consensus is that any changes will necessarily be upward, in view of the rise in crude rubber to over 40 cents a pound.

Truck production is steadily expanding in line with the increase in general business activity. March output should be 30,000 or more vehicles and the year may see a total that will beat the record of 1922. Every day brings news of the opening of additional bus lines and bus production is beginning to be a factor of major significance to the automotive industry as a whole.

The Merger Rumor Again

Wall Street, which ever has its ear cocked for vagrant rumors, is aflame with discussion of reported mergers in automobile companies. While these reports are not uniformly without foundation, the fact remains that any actual consolidations are likely to be few and far between and their consummation will be the result of prolonged preparation and negotiations.

The obstacles to mergers are many, and the advantages, especially so far as economy in production is concerned, are subject to serious question. In some cases a company might benefit by acquiring the dealer organization of another, or by obtaining another outlet for the product of equipment subsidiaries. The restraining factor is that a large proportion of the strong companies are still controlled by men who have grown up with the industry, who have pride in their product and who are unwilling to lose their independent position.

But all this discussion is aside from the main issue of the moment, which is spring automobile business. Mergers, it is probable, will remain in the background so long as the active season in production and sales continues.

The current factory and market tendencies in various cities as reported by representatives of AUTOMOTIVE INDUSTRIES are given below.

National Survey Shows Industry Gaining in Sales and Production

Toledo

Passenger car sales in March in this territory have been very good and in many cases have been ahead of expectations a month ago. Weather has had little influence on sales, but real spring days have just arrived and the outlook for April is bright.

Used cars are moving nicely and stocks are quite low. There is plenty of money available in banks and the credit situation is very good. Time payments are made satisfactorily, with an extremely small amount of overdue paper. Farm sales have shown the big increase in the last month, while city sales have been a trifle slow. Employment is gaining here, having just passed what it was a year ago, and all lines of business are expected to gain next month.

Atlanta

Distributors in Atlanta report that automotive sales over the Georgia and southeastern territory have enjoyed a respectable increase during the past month, comparing quite favorably with the volume for the corresponding month last year, particularly the lower priced and medium priced cars. Little improvement is noted, however, in sales of higher priced cars.

The used car situation is as serious a problem as ever and the trade is employing every means possible to get rid of a part, at least, of the used car surplus. A number of low priced special sales have been held by dealers the past month, and new car sales are being somewhat affected as a result.

Accessory and equipment sales have picked up considerably since the first of March. Generally speaking, the outlook for business appears to be quite satisfactory, for cotton prices are still being maintained at a high level, having held a stable price now for several months.

Detroit

There is every certainty that March production will run well over the 300,000 mark. Despite this large increase in output, factories will carry over into April many thousands of unfilled orders. In some cases the March unfilled orders represent practically a whole month's output. This means that, going into April, some factories will be as much as one month behind orders, with practically all running at least one or two weeks behind the total.

Ford total sales at retail in March will approximate 160,000. Factory production has been slightly higher than this in anticipation of increased buying in April.

Chevrolet production schedules as set down for April will approximate 57,000, an increase of about 7000 over March.

Hudson-Essex will run 1000 daily at once. This is an increase of 200.

Dodge continues at capacity, a total of 1000 to 1150 daily, with Buick approaching this figure.

In a number of factories new March production totals will be set, among these being Maxwell-Chrysler and Paige-Jewett.

Chicago

There was another upward tendency in retail selling in the Chicago district during March, although, on the whole, the month did not produce the volume anticipated thirty days ago. Some dealers at one extreme experienced large increases over the preceding month of this year and over March, 1924, while at the other end of the string are merchants who openly admit that the month just passed was not as good as February. The great majority, however, enjoyed a business as good or better than February's. Complaints are heard here and there of inability to deliver cars promptly, factories being behind dealer orders from one to three or more weeks. There is little stocking in the territory. Wholesalers report continued improvement of buying interest in rural sections and they are instructing their dealers to concentrate on the cultivation of this movement.

While March business was below expectations in many quarters, there is a popular conviction in the Chicago trade that there will be a gradual toning up from now on. Used cars are moving fairly well.

Columbus, Ohio

With better weather conditions prevailing for the greater part of March, sales of new passenger cars in Columbus and central Ohio territory have shown a nice increase over the previous months of the year. Sales compared very favorably with those of March last year and in some instances good increases are shown in new car sales. General business conditions, while not the best, have improved to a certain extent and there has been a marked reduction in unemployment. In the lines ranging from $800 to $2,000 sales have been about 20 to 25 per cent better than in March last year. In higher priced lines the increase is not as noticeable. Used cars are selling better than formerly, but they are still somewhat of a drag on the market. Many of the agencies are slashing prices in order to reduce the number of used cars on the floor.

Cleveland

Sales of both new and used cars increased in March in Cleveland, and judging from the reports of many dealers, the volume of business has exceeded that of the corresponding month a year ago. There are dealers here, however, whose sales in March, 1925, are below those of the same month last year.

The weather has been favorable in Cleveland during March, much more so than a year ago. The stock of used cars is as a rule lighter than it was last year.

Des Moines

Excellent automobile weather during the latter part of March did much to swell the sales of dealers operating in the State. Drying winds put the dirt roads into passable condition, enabling country dealers to work their territories.

Des Moines dealers report business from fair to very good. Used cars are still moving slowly. A slight pick-up has been noticeable during the last thirty days, but stocks are slow in turning. In general, dealers are not heavily stocked with used cars. The winter holdover was smaller than usual.

Philadelphia

Car dealers here enjoyed April weather and April business during March, and there is a strong tone of optimism in the trade. The sale of lower priced cars has been excellent. Medium priced automobiles have been moving at good rate, but the market for high priced cars has proved disappointing, and sales, compared with the others, are few and far between.

Used cars are not selling briskly. Many dealers and distributors assert that their stocks are well cleaned out, but not a few are advertising them in the daily newspapers, which proves that there is a considerable stock on hand in some quarters. However, it cannot be said that the dealers, as a whole, are overstocked with used cars.

About 82 per cent of the sales of new cars are carrying time payments, and these, according to the majority of reports, are being settled satisfactorily. Close to 85 per cent of truck sales are entailing a time payment proposition, and these payments are not being made generally as promptly as are time payments on passenger cars.

Louisville

New car sales are slightly above the same period of 1924, due principally to exceptionally good spring weather and public confidence of increased general prosperity. Dealers expect a good selling season this spring and summer and, while the opinion prevails that the year 1925 will not be a banner year, a greater profit is expected than heretofore, due to a tightening of trade allowances on used cars. Used car stocks are below last year and every effort is being exerted to keep them low, even at the expense of curtailing new car sales.

Rising prices and prospects of a good year for the farmers and tobacco growers has stimulated business in the smaller towns and outlying districts. Country dealers report sales on the up grade. Car repossessions show a decline, indicating a greater general prosperity.

Salt Lake City

Weather during March, on the whole, was good and business was about normal for the month. Used cars are selling better than they were. Very few dealers are carrying really heavy stocks of used cars now. The credit situation might be described as normal, and no one complains of slow time payments. The industrial outlook is still regarded as highly satisfactory.

Los Angeles

Retail sales for both passenger cars and commercial vehicles in March showed an appreciable momentum in the Metropolitan district, but the demand in rural and suburban districts has not been equally pronounced. Weather conditions have been excellent, but in Southern California this is a deterrent rather than an incentive at this time because of the need for rain. Agricultural districts report that unless heavy rains come soon sugar beets will not be planted this year and the fruit crop will not be normal.

Dealers are heavily stocked with used cars, the sales demand being good but not sufficient to reduce stocks. There is a slight improvement in collections and to help meet the situation some dealers are exacting a minimum down payment and allowing two years on balance.

(*Continued on page* 640)

New G.M.C. Trucks Have Four-Wheel Brakes as Standard Equipment

Many parts are interchangeable between 1 and 1½ ton models. The driver's compartment is comfortable. Pneumatic cord tires are used to permit high speeds.

By W. L. Carver

FOUR-WHEEL brakes have been adopted as standard equipment on two new lines of trucks which are now in production at the plant of the General Motors Truck Company at Pontiac, Mich.

In addition to this outstanding feature, pneumatic cord tires also are regular equipment. This combination permits higher road speeds and in order to take full advantage of this characteristic, driver comfort has been enhanced by an arrangement of the driving compartment which approaches that of the passenger car as regards convenience.

Liberal use has been made of pressed steel and the installation of rubber insulators at the engine supports have reduced the tendencies toward laborious handling and vibration which have been largely responsible for the element of driver fatigue in motor transport work. The complete chassis of the larger unit, which has a load capacity of 1½ tons, weighs 3643 lb. with a body allowance of 1200 lb. The smaller or 1-ton chassis weighs 3433 lb. and has a body allowance of 900 lb. Model K-32, the 1½-ton job, has a wheelbase of 154 in. while Model K-17, the 1-ton chassis, is 136 in. long between the axles.

From the service angle these two new chassis are of unusual interest due to the duplication of the parts ordinarily requiring service work. All of the major units of the larger job are used also in the smaller one. Engine, radiator, gearbox, tubular propeller shaft and axles are identical with the exception of the pinion and ring gear in the rear axle. For the smaller chassis this combination has a ratio of 6.1 to 1 as against 7.125 to 1 for the heavier job. As the larger chassis has a maximum governed speed of the 25 m.p.h. while the smaller is governed to 30 m.p.h. with an option of 35 m.p.h., the use of the same braking systems is perfectly feasible In the first case, the combination of heavier load and lower speed is comparable to the reverse of this combination as related to the smaller chassis.

Units Similar on Two Models

In view of the similarity of the mechanical units, these will be described first and followed by a discussion of the specific characteristics of each model. Inserted cylinder sleeves—which have been identified with all of the more recent power plants of this company's product—are continued in the new four-cylinder engine. This power plant has a bore of 3 9/16 in. and a 6-in. stroke and is of L-head construction. At the normal governed speed, which is 1810 r.p.m., the output of this engine is 37 hp. The cylinder sleeves are machined separately and are inserted at openings in the top of the block. This construction allows for ready replacement of any individual cylinder barrel or after long service, of all of them without the usual necessity of discarding the entire block.

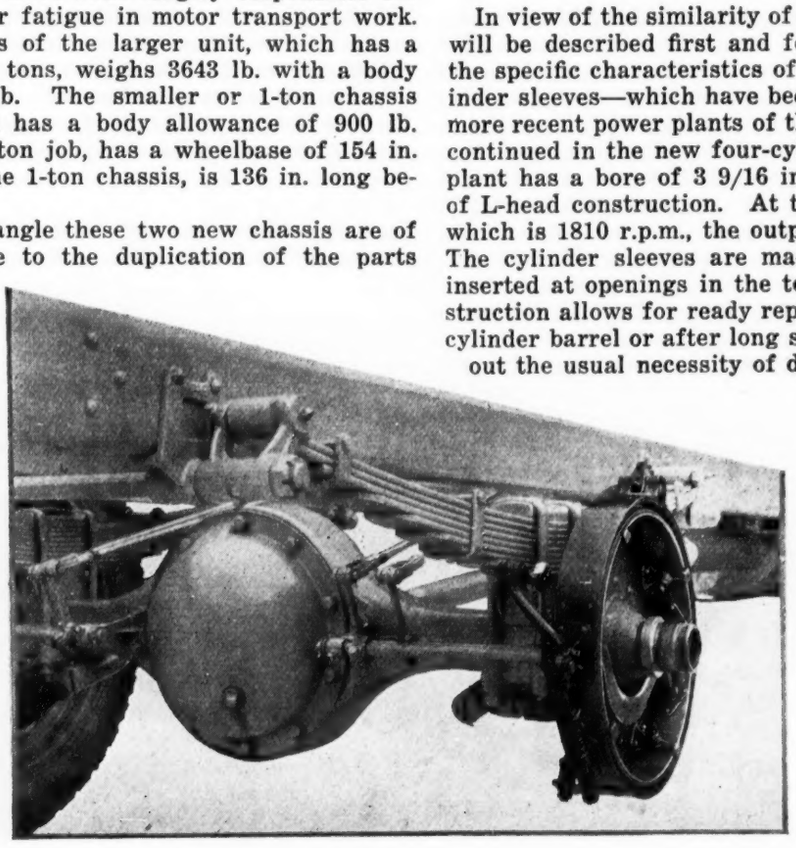


Fig. 1 (above)—Head-on view of G. M. C. truck chassis showing new radiator form, splash guard and four-wheel brakes

Fig. 3—Banjo type pressed steel rear axle showing details of brake construction

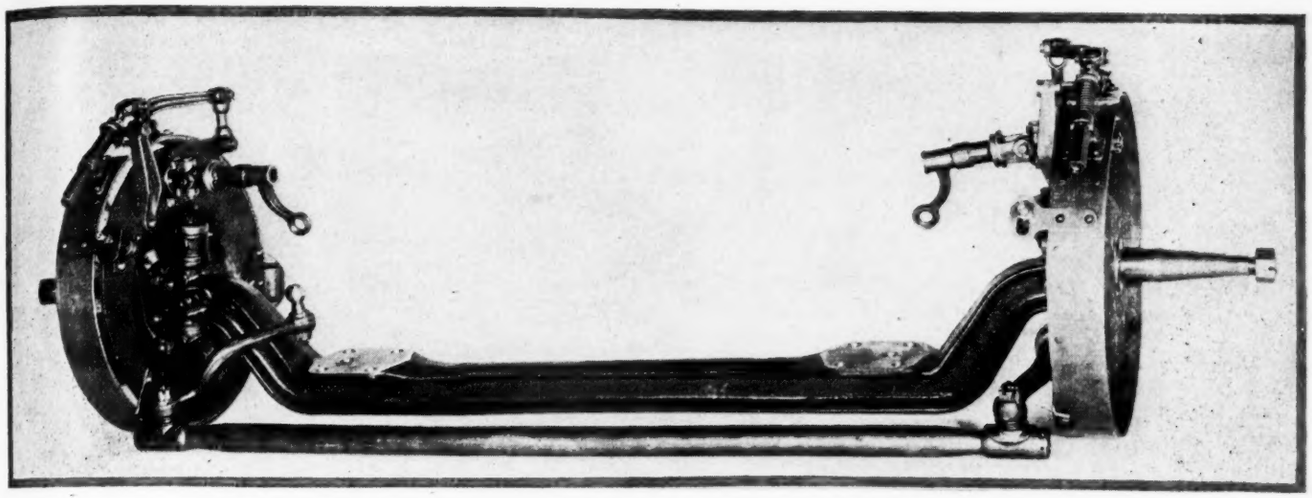


Fig. 2—Front axle and brakes with one-piece non-adjustable tubular cross link

The cylinder block proper is cast iron and matches with the usual cylinder head which contains the combustion chambers at approximately the top point of the piston head travel. Rigidity of structure is obtained by carrying the block down to a plane well below that of the crankshaft centerline where a flange is provided for the pressed steel oil pan. In line with the cylinder arrangement, the valve tappets at the right side of the engine are mounted in groups of four in detachable carriers, each of which is protected by a pressed steel cover. High cylinder wall temperatures, which are conducive to fuel economy and to reduction of crankcase dilution, are maintained by introducing the cooling water into the upper part of the jacket. The water pump is at the front end of the cylinder block and is driven with the fan by a cord type belt from the accessory shaft. Therefore the lower portion of the water jacket is under thermo-syphon conditions, while the upper is subject to pump circulation.

A centrifugal governor is built into the timing train at the front end and the connections to the governor throttle valve in the intake manifold are inclosed in cast and tubular steel housings. A hot spot is provided at the head of the vertical riser of the intake manifold and the carbureter is located rather low in order to eliminate the effects of the turbulence set up at the carbureter throttle valve. As illustrated by Figs. 4 and 5, ignition is by an Eisemann magneto which is driven through a flexible coupling at the rear end of the generator shaft. This unit and the starting motor both are made by Remy and are located at the left side of the power plant, the latter being placed back of the bell housing and below center. Both electrical units are secured by standard S. A. E. bayonet connections.

Full Pressure Lubrication

Full pressure lubrication is utilized throughout the engine and the oil pump with a large strainer is located within the pressed steel oil pan. Three bronze backed, babbitt-lined bearings support the crankshaft, while the lower rod bearing is cast-in babbitt. The dimensions of these bearings are tabulated below:

	Dia. in.	Length in.
Front main	2½	2 5/16
Center main	2 3/16	2 3/16
Rear main	2¼	2 13/32
Lower rod	2	2¼

The piston pin is locked in the four ring light piston and engages with a phosphor bronze bushing of 1⅛-in. diameter and 1⅝-in. length, which is pressed into the upper end of the rod. Inserted cast iron bushings at each of the bulk heads in the crankcase support the camshaft.

One of the most novel features of the entire layout is the method of engine suspension. As shown by Figs. 4 and 5, the provisions for three point support on the engine are conventional, but the front or trunnion mounting is modified by the addition of an intermediate rubber rig which is retained by the bracket fastened to the front cross member. No metallic contact is made at the front and at the two rear supports. Rubber pads are carried in pressed steel saddles which are riveted to the side members of the frame. The horns on the bell housing bear on these rubber pads. Bolts passing down through the horns, rubber pads and saddles are fitted with rather heavy springs at the lower ends to take full advantage of the resilient characteristics of the rubber pads. This mounting materially reduces the amount of engine vibration which is transmitted to the frame.

Unit Powerplant Construction

As indicated, unit power plant construction is used and the bell housing completely incloses a multiple disk clutch which consists of 5 driving and 6 driven plates. Alternate plates are fitted with woven friction material. A ball bearing which is lubricated from the exterior is used at the throw-out bearing. Ball bearings also are installed at the pilot bearing at the rear end of the crankshaft and at the upper shaft mountings of the gear box. The lower shaft assembly is mounted on roller bearings. The conventional three-speed-and-reverse gearbox with levers installed at the center position is used. Provisions for pump installation are made at the left side of the gearcase and a large hand hole cover at the right side can be removed to accommodate a power take-off. The area of this opening is large enough to allow the removal of the entire countershaft assembly in service work.

Double yoke universal joints with hemispherical metallic inclosures are used at both ends of the tubular propeller shaft which is 2½ in. outside diameter. The same tubular propeller shaft is used on both models, but the K-32 or 1½-ton chassis has a short intermediate shaft just back of the gearbox and an intermediate universal joint which is suspended from a cross member forming a conventional three joint construction.

In the 1-ton chassis the propeller shaft joins the rear end of the gearbox and the axle.

Another innovation is the pressed steel banjo rear axle which has a large inspection and service opening at the rear closed by a light pressed steel cover. The differential is mounted in a carrier which bolts on the forward face of the banjo. Pinion shaft, differential and wheels all are mounted on ball bearings in a three-quarter floating construction in which the chrome nickel live axles have a maximum diameter of 2 in. Spline shafts are used extensively in both the rear axle and gearbox. Rear wheels are mounted via the intermediate ball bearings on extensions at the ends of the axle and are driven by pressed-on flanges at the outer ends of the live axles. The rear axle housing is substantially rectangular in section and the spring pads are dowelled and clamped on the resultant flat seats by the heavy U-bolts which secure the springs.

Rear Brake Design

As illustrated by Fig. 3, the rear brakes are supported by a stamped steel disk which is riveted in with the wheel bearing extension. As the external or service brakes are identical for all four wheels, the description pertaining to those at the rear will suffice also for the front. The construction of the external brakes is substantially the conventional contracting band type with a ⅝ in. wrap in the forward direction at all wheels. The diameter of the service brakes is 16 in. and the width of the bands is 2 in. The actuating levers and adjusting sleeves for the rear brakes are located back of the axle and therefore are accessible for adjustment. The external brake operating shaft is paralleled by a similar shaft for the internal brakes and both are supported in a common bracket at the inner ends.

A continuous steel band replaces the usual expanding shoes in the internal brake. The free ends of the band are actuated by a toggle mechanism which in turn is controlled by a long curved link that avoids the hub and connects with the operating lever at the back of the carrier. As in the external brakes, copper asbestos lining is riveted to the internal bands. The diameter of the internal bands is 15 in. and the width 2⅛ in.

Front brakes are operated by the usual universal shaft, which is swiveled in a ball joint at the frame channel and connected to the operating lever on the carrier by a block and trunnion universal joint which is approximate alignment with the inclined king pin center. Boots are placed over both ends of the floating shaft. An equalizer located just back of the foot pedal divides the pressure applied to the front and rear brakes, but individual adjustment is used beyond this point, that is, no equalizer is used between the two sides of the system. The entire braking system follows practice which has been demonstrated in other units made by the General Motors Corporation.

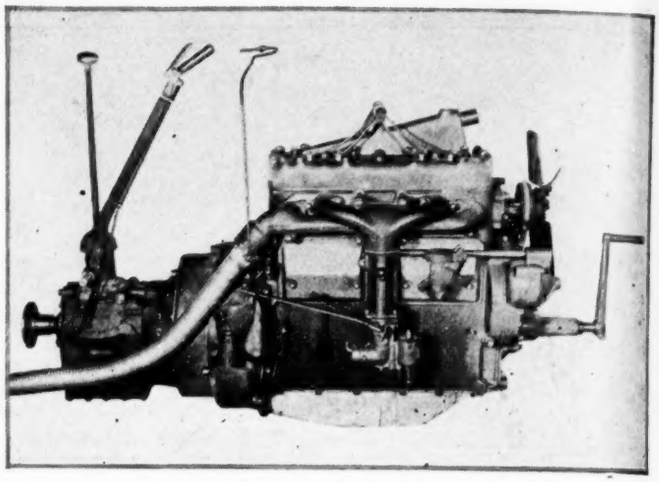


Fig. 4—Right side of new truck engine showing hot spot manifold and inclosed governor connection

Tubular radius rods are installed at the rear end with ball joints at both ends. No adjustment is provided at either end of the radius rod, while the forward ball is attached to a bracket which also carries the front bolt for the rear spring. The rear ball is attached to a pad which is doweled and clamped to the axle by the spring U-bolts. These radius rods only locate the axle but do not carry any of the torque reaction which is taken by the springs, although they are shackled at both ends.

As illustrated by Fig. 2, the front axle is the conventional drop-forged I-section, being 2⅝ in. deep by 2 in. wide over the flanges. Springs are overmounted and the middle section of the axle is given a decided drop, although there is liberal ground clearance under both front and rear axles. King pins are of liberal dimensions and are inclined so that the projected center lines fall near the centers of the tread at the ground. One piece tubular drag and cross link construction is used and no adjustment is provided on either member. Due to the inclination of the king pins, ball ends are required for the cross link.

Steering is by a worm and split nut gear, which is attached to the left side channel. The steering column is set at an appreciable angle and carries an 18-in. diameter wood wheel at its head. Spark and throttle controls are situated at a quadrant placed just under

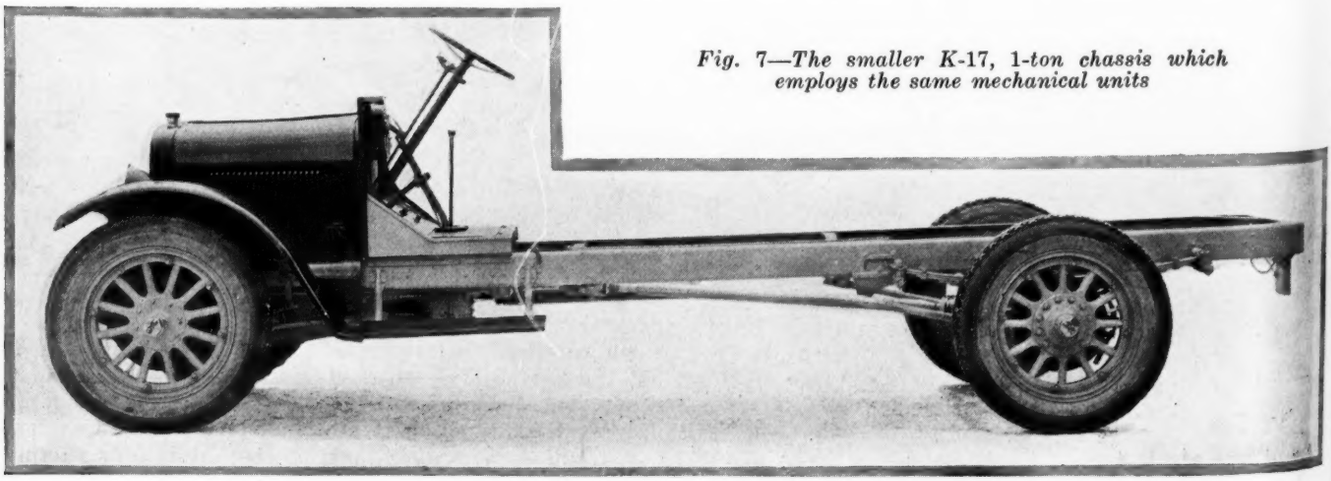


Fig. 7—The smaller K-17, 1-ton chassis which employs the same mechanical units

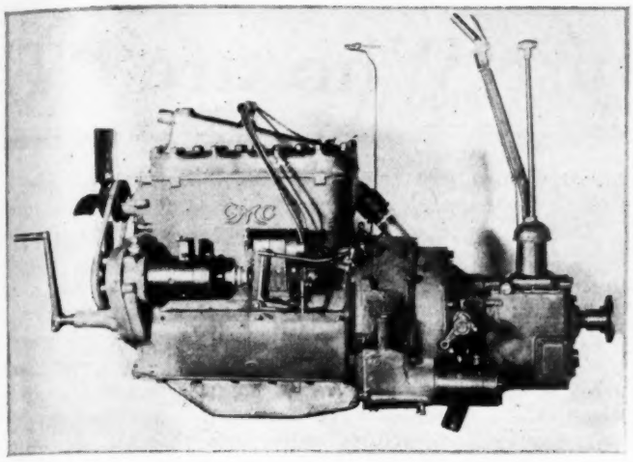


Fig. 5—Left side of engine showing arrangement of electrical equipment

the wheel. The fin and tube radiator with separate shell is identical on both models. As illustrated by Fig. 1, a new contour has been adopted and appearance is further enhanced by a splash guard between the spring horns. Stamped steel front fenders which are equipped aprons are carried back to the running boards, the level of which is well below the wheel centers.

Dash, toe board and foot board are part of the chassis equipment. All of the switches, instruments and the choke control are installed in a common enameled box which is placed at the middle of the dash. The length of the deck from the back of the dash to the front wall of the seat pedestal has been increased by about 4 in. over past practice for the purpose of setting up better seating conditions and improved driver comfort.

On the K-32 chassis the body allowance back of the seat is 136 in. The side channels of this chassis are pressed steel and are 5⅞ in. deep, ¼ in. thick and the top and bottom flanges are 3 in. wide. Four pressed steel cross members and rear gusset braces tie the side channels together. This model is illustrated by Fig. 6. Tires are 36 x 6 non-skid cords all around and a 7.125 reduction is used at the spiral bevel gears in the rear axle. The wheelbase is 154 in. and tread at the front end is 55¾ in., while that at the rear is ¼ in. more.

Due to the shorter wheelbase and smaller load capacity, the side channels of the frame of the K-17 or 1-ton chassis are somewhat lighter than those of the larger models. The depth in this case is 5½ in. and the thickness is 3/16 in. and the flange width is 2½ in. Four cross members are used again. In this model the frame allowance back of the seat is 102 in. Tires for this chassis are 34 x 5 non-skid cords all around, although 36 x 6 tires fit the same rims and are available at an increase in price. Rolled steel felloes are mounted on wood spokes for the wheels of both models. The gear reduction at the rear axle for the smaller model is 6.1 to 1.

Spring width and length for both models is the same, although a difference is made in depth and number of leaves at the rear ends. Front springs are 38 in. long and 2¼ in. wide with 8 leaves and a depth of 2¼ in. Both sizes of rear spring are 54 in. long and 2½ in. wide. K-32, the 1½-ton job, has 12 leaves at the rear with a depth of 4⅜ in., while the 1-ton chassis has 9 leaves and a depth of 3.2 in. Spring eyes are bronze bushed and no center bolts are used. Spring clips are alloy steel as are the spring leaves and the rear springs are mounted in free shackles at both ends.

15-Gallon Gas Tank

Gas tanks of 15-gal. capacity are located under the seats of both models. To prevent the interference of operation due to dirt in the carbureter, fuel lines are equipped with a sediment bulb which combines a dirt trap, shut-off valve, strainer and drain. With the exception of the high tension spark plug leads, all of the electric wiring is fully armored in metallic flexible hose and all-metal junctions. Metallic flexible hose also is used for the connection between the exhaust manifold and the tubular muffler.

Standard equipment includes head and tail lamps, the former having auxiliary dimmer bulbs. Self-lubricating bushings are used at all required points in the brake control system and all necessary lubrication points on the chassis are supplied with pressure gun fittings. Tool equipment is unusually complete and includes the usual jack, grease gun and a very complete line of standard and special wrenches.

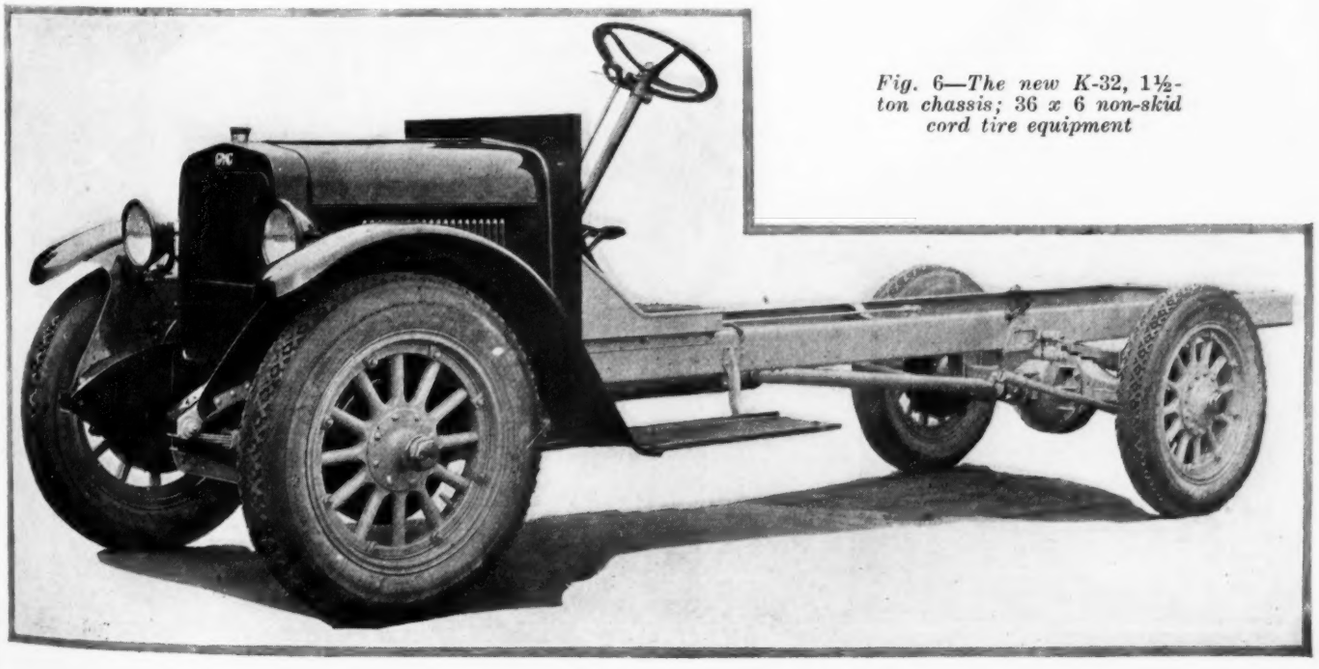


Fig. 6—The new K-32, 1½-ton chassis; 36 x 6 non-skid cord tire equipment

Yes, Yes! But—Just Who are "Th

TEARING down to the finish line with his peroration, after an hour and a half of sonorous, ear-splitting oratorical ferment, the inspirational speaker sits down mopping his brow and modestly pretends not to notice the loud hand-clapping which marks the conclusion of his effort.

"———— intensity, outstanding achievement, everlasting stick-to-itiveness—those, gentlemen, are the qualities which enabled John Gettem to sell more Blunk cars in the month of January than any two other salesmen in the territory.

"He saw the big picture!

"He discovered the plus factor in business and put it to work selling automobiles!

"He ate, slept, talked and dreamed Blunk cars. He made himself into a supersalesman.

"He rang the bell!

"And if every man in the room will take this story home with him, will emulate John Gettem, the Blunk factory will have to double its capacity to build all the cars needed in 1925."

There is a scraping of chairs. The sales manager, who is presiding over the annual dealer dinner of the Blunk Motor Car Co., has difficulty in making himself heard as he tries to express his thanks to the orator before a third of the audience leaves for Suite XP43, where it is rumored a keg of nails is about to be opened. But he is an experienced chairman and he has finished the necessary complimentary remarks before more than a hundred members of the audience have left. He adjourns the meeting before further damage can be done.

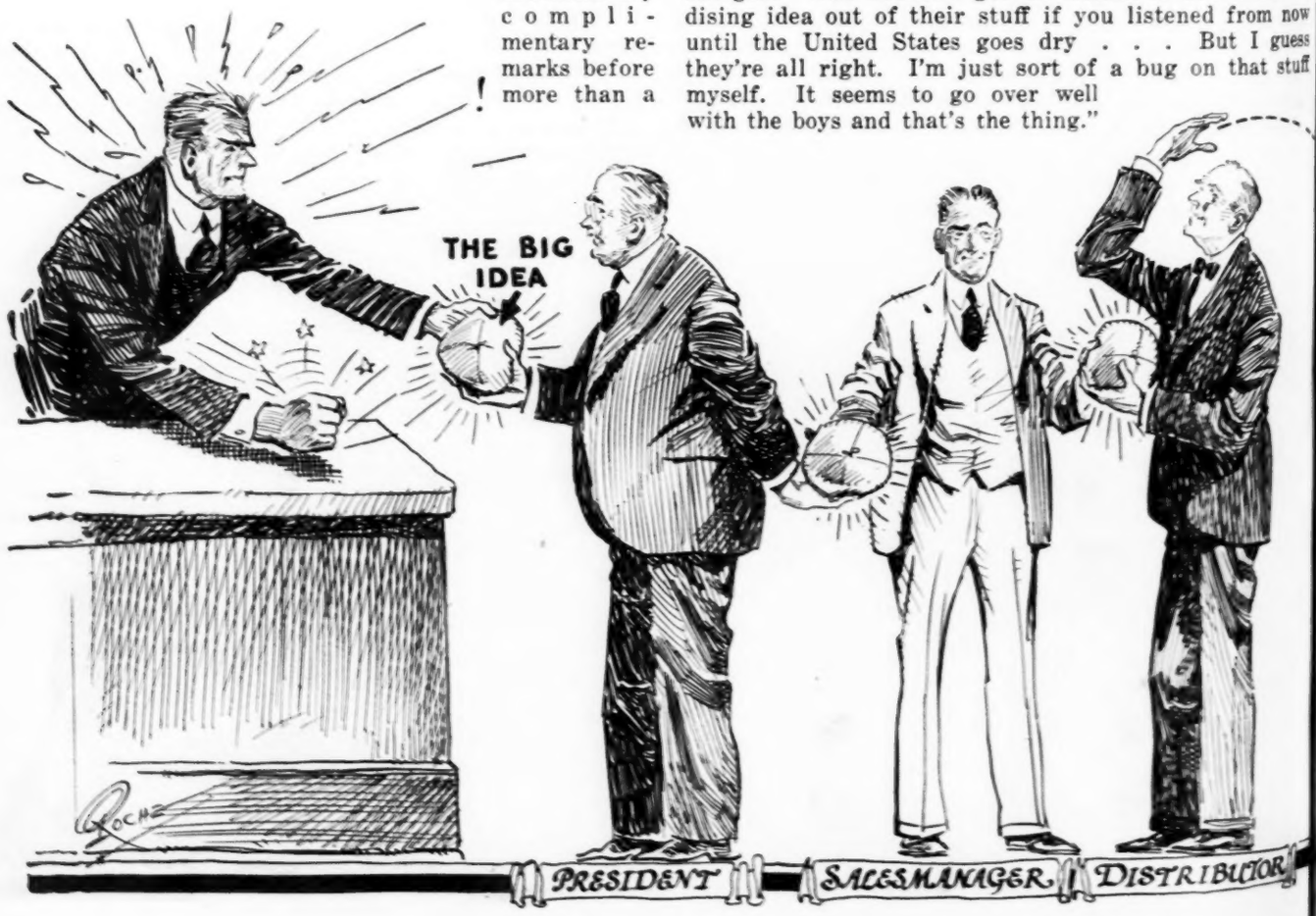
The thirsty third having departed, the other dealers hang around to exchange troubles with one another and to shake hands with President Blunk who, a few hours before, endeared himself to their hearts by reviewing the past year's difficulties, expressing confidence in the future and telling them what good guys they were, all within the brief space of 5 minutes. President Blunk never has been considered an orator—not even by himself, and consequently is quite popular with his dealers.

As the factory executives, the distributors and the dealers mill around the dining hall and the lobby just outside, the conversation often drifts to the dinner. A big distributor is chatting with the factory sales manager.

"Fine party," he tells the f.s.m. "The old man got across fine. He just stands up and tells the boys what he thinks. You made a good talk, too."

"Yes, it went off pretty well," comes the reply, "a little long, though. I talked 5 minutes longer than I had intended." Then, glancing up guardedly to see the facial reaction of his listener, "This last fellow laid it on a bit thick in places, don't you think?"

"Well, yes, I suppose he did. Seems as though the boys like it, though. They have one of them at nearly every meeting of any kind which I attend. Personally, of course, fellows like that set my teeth on edge. They stand up there and spill out an unadulterated lot of eyewash that would insult the intelligence of my ten-year-old girl. You couldn't get an honest-to-God merchandising idea out of their stuff if you listened from now until the United States goes dry . . . But I guess they're all right. I'm just sort of a bug on that stuff myself. It seems to go over well with the boys and that's the thing."



The Boys"?

An After-dinner Story of Blunk and Bunk

By Norman G. Shidle

"Guess you're right," agrees the f.s.m., "but I did think this chap dragged it out too long. Guess we'll have to keep on having something like it, though, as long as the boys like it. . . . Well, so long, I'll see you again before the week is out."

And he passes on.

The big distributor turns away and find his Oskangi dealer waiting to have word with him. "Hello, Ben, glad to see you." They shake hands. "How'd you like the party?"

"Great, wasn't it," says Ben, smiling. "Say, did you get that one the old man pulled about the Irishman who went in to buy a sedan? Good scout, the old man. He's a real human guy. Talks as though he meant what he said."

"He does, indeed. And he usually says something worth while." A momentary pause. The big distributor puts his next question in an inquiring tone, with a veiled glance not unlike that which the factory sales manager had leveled at him only a few moments before. "That chap that spoke last was high-powered, wasn't he? Fellow like that puts a lot of pep into sales work."

"Y-yes, oh yes." The dealer searches for words. "Yes, he does. Not so very practical, of course, but very inspirational. Goes over well with the boys. Does a lot of good."

"Sort of sends you back home with new enthusiasm for your work." This from the big distributor.

"Well, yes, I suppose it does." A momentary pause. "Personally, of course, I don't get anything out of stuff like that. A certain amount of it is perfectly true. Nobody can dispute that. But what the hell? Who wants to sit up for two or three hours and listen to somebody shout at them that the world is round and that the sun rises in the East. It sort of rolls off me like water off a duck's back, but I guess a lot of people like it. They must. I hear at least one speech like that every time I go to any kind of a meeting. Seems as though the boys like it, so I guess it's worth while. . . . Guess I'll be on my way."

The big distributor turns away with a quiet smile, which gradually fades into a contemplative stare.

The dealer is confronted by a sub-dealer, who greets him with this:

"Say, did you get that egg that spoke last? Honest to John, Ben, I thought I'd have to get up and crown him two or three times. If words were dollars that bird woulda spent enough this afternoon to buy the Wrigley Building. . . ."

"Aw, he wasn't quite that bad, was he?" righteously protests the dealer. "Very inspirational in some ways, I should say."

"Inspirational, me eye! Just answer me one question, Ben—why do they let 'em live?

Just then the factory sales manager strolls up. "Hello, Ben; hello, Joe. How's the world treating you?"

Duet of "Oh, pretty good, how's everything at the factory?"

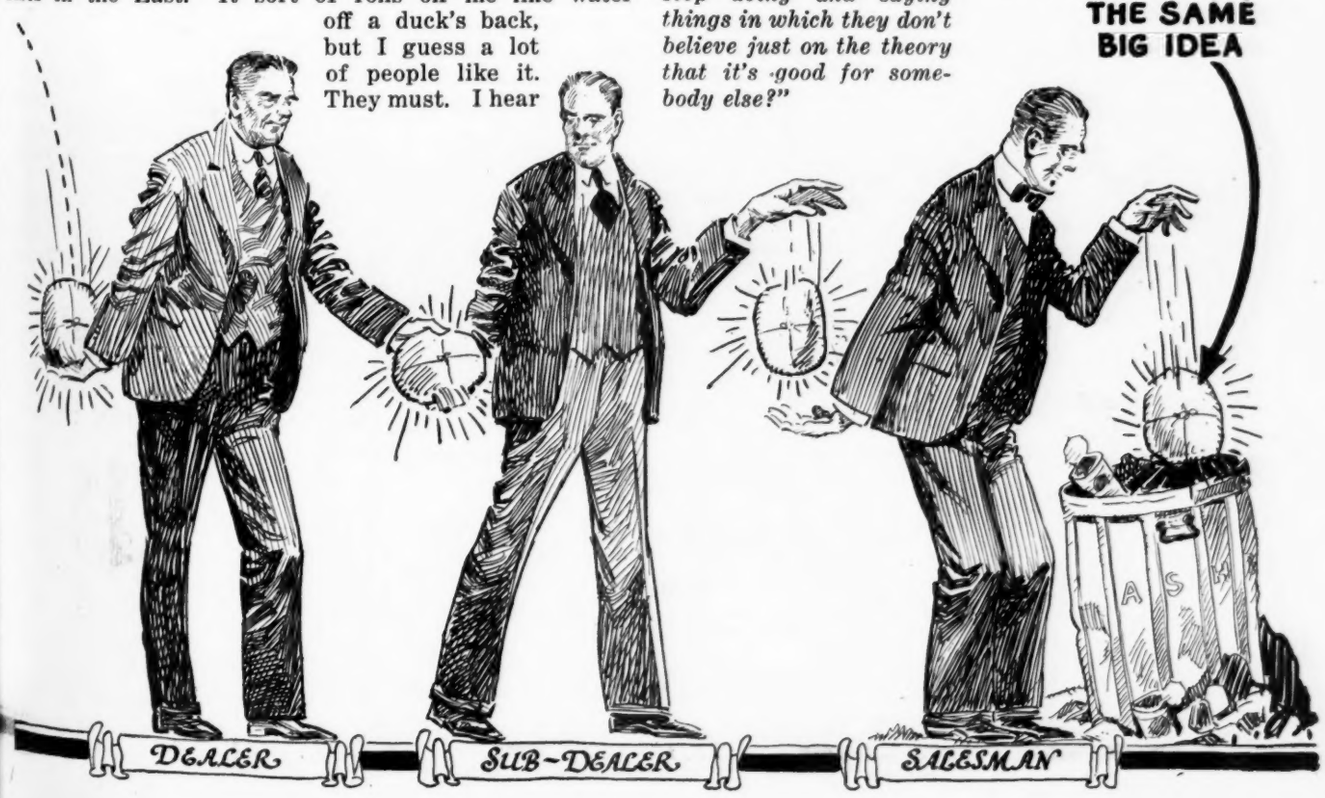
Answered by "Fair enough up there. We're all right so long as you fellows sell the cars. Like the party?"

Again the duet, "Fine. Last fellow was a little long, but that sort of stuff seems to go good with the boys. . . ."

And the great God of Truth, who watches over the affairs of men however little they worship him, looked down on the milling mass of men, walking about talking to one another in the smoke-filled dining hall, and mused to himself:

"Who are 'the boys' all these men have been talking about?

"How long will it be before I can get men to see that all of them are very much alike? Before I can get them to stop doing and saying things in which they don't believe just on the theory that it's good for somebody else?"



No. 1—The Sikorsky 12-passenger commercial airplane showing the mounting of the two 400-hp. Liberty engines. The height of the passenger cabin can be seen by comparing it with the height of the mechanic standing in front of the machine

Safety Is Outstanding Feature of Sikorsky Plane Design

Steel and duralumin construction used throughout. General appearance is conventional. Rivets and bolts used to join parts. Fuselage built to give maximum passenger comfort.

By Leslie S. Gillette

SAFETY—the most important factor in the operation of civil aircraft—has been allowed to outweigh all other elements in the designing of the 12-passenger Sikorsky twin engined biplane recently built at Roosevelt Field, Long Island, N. Y. Igor I. Sikorsky, a pioneer Russian aeronaut, has developed the machine. It is built throughout of steel and duralumin except for the fabric coverings of the wings and fuselage and is powered with two Liberty engines driving tractor airscrews. These engines are mounted on each side of the fuselage. At full throttle the speed is said to be 115 m.p.h., the normal cruising speed 105 m.p.h. and the landing speed 50 and 55 m.p.h.

A 50-minute flight over New York City was arranged specially for AUTOMOTIVE INDUSTRIES. The ailerons, elevator and rudder controls, which are the "Dep" type, were extremely easy to operate and responsive to the slightest movement. The machine behaved very steadily in "bumpy" air, while no vibration of any part was apparent even when flying on one motor only. The range of vision from the inclosed cabin is good and the seating arrangements are comfortable.

A RECENT announcement that the General Airways System, Inc., of which Col. H. E. Hartney, N. A. A., is Vice-President, intends to operate Sikorsky biplanes on a regular day and night schedule between Boston and the Twin Cities lends added interest to this article, which describes the new plane in detail.

The immediate plans call for operating the present Sikorsky machine on a daily sight-seeing tour of 100 miles, extending over and around City of New York.

Five planes of the improved type will be ready this fall for cross country operation.

Two planes, one at each end of the route, will start simultaneously, the three remaining machines being held in reserve and stationed at the main points along the route.

The general characteristics and appearance of the machine do not depart from conventional lines and with few modications it can be readily converted into a heavy war bomber. Ruggedness and simplicity are features of the structure which is made chiefly of angles and channels forming girders, while the engine bearers, struts and landing gear are made of seamless steel tubing. No welded joints are employed, rivets and bolts being used exclusively to join the various components together.

The main spars of the wings are made of steel angles riveted together and

forming I-beams to which are secured the main ribs. The latter are constructed of channels and ties from .040 in. to .050 in. thick, forming girders. These are spaced about 3 ft. apart, giving support to six light spars running parallel to the wing spars. Lighter ribs of .020 are riveted to both the main and light spars. With a total weight of 1600 lb. the wings have a load factor of five to one at full load.

No. 2—Side view of the Sikorsky biplane showing pilot's cockpit located above the spacious cabin. The door leading to the cabin can be seen beneath the lower wing; when opened it forms a staircase for entrance and exit

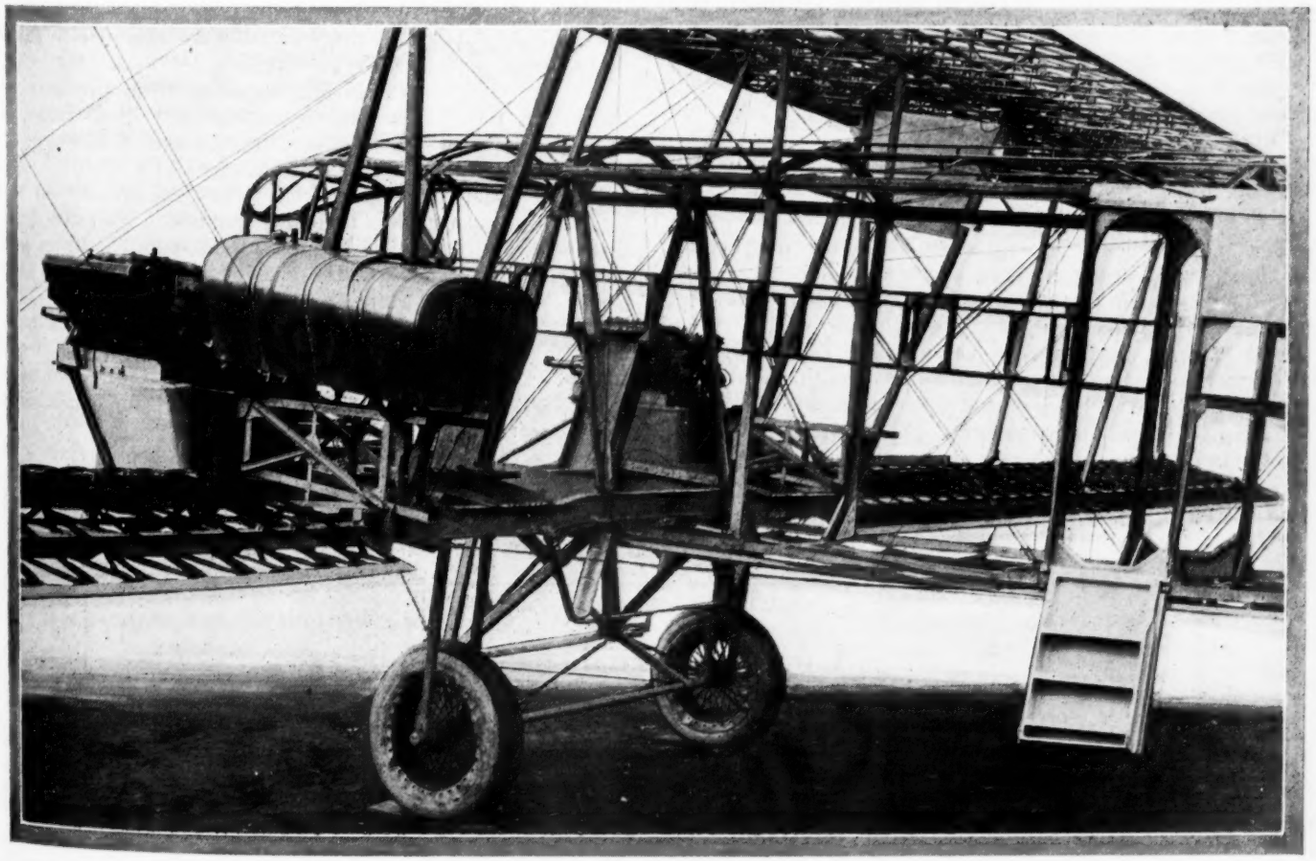
In designing the fuselage considerable attention has been devoted to giving maximum comfort to the passengers. The front part forms a roomy cabin of 480 cu. ft., the dimensions being 20 ft. x 4 ft. x 6 ft., which allows plenty of room for the mounting of ten wicker chairs, carrying of a quantity of baggage and moving about.

Entrance to the cabin is provided by two specially constructed doors at the rear, the upper part of which can be operated as a sliding window. The lower part opens outward, forming a stairway supported by two chains acting also as hand rails. In the center of the cabin two detachable panels are provided to permit the mechanic to step out on the lower wing and inspect the engines during flight if necessary.

The pilot and mechanician sit in a roomy, well-protected cockpit connected to the passenger compartment by a wide door. The cabin is virtually fireproof and free from fumes, with all leads, fuel lines and controls being carried on the outside. The longerons of the fuselage are made of steel angles being securely braced by gusset plates and piano wire. Steel channels are employed as struts in the parallel section of the cabin with duralumin channels used in the tail.

The monoplane type of empenage is built entirely of steel, consisting of I-beam spars with ribs of light steel channels. Special design in the camber of the two rudders permits easy control in the case of flying with one motor stopped. The incidence of the tail plane is adjustable by simple movement of a lever located on the left side of the pilot's cockpit. All control surfaces are built of steel and duralumin, along similar lines to those of the main wings.

The tubular undercarriage is exceptionally strong and well braced, while located inside the lower wings, the landing gear shock absorbers have long play, allowing a possible displacement of 12 in. in the case of a bad landing. The outside struts supporting the wheel axles are hinged and by removing two bolts it is possible to



No. 3—Constructional details of the Sikorsky plane showing the all metal girders, ribs and struts employed in building of the wings and fuselage. The mounting of the fuel tanks behind the engines can be seen clearly

replace a wheel very easily in less than a minute's time.

Two Liberty motors, each delivering 400 hp. at 1680 r.p.m., are mounted in nacelles on either side of the fuselage and rest on the lower wing. Each motor installation together with oil tanks can be removed and replaced as a whole unit in a few minutes by removing the four main bolts, and disconnecting the engine controls and water pipes.

These operations can be performed by two men using a small hoist during the time of refueling and reloading of the ship. The matter of quick engine replacement is an important feature in the economical operation of civil airplanes.

The radiators are placed behind the engines and can be moved up and down from the cabin to vary the exposed radiating surface. At their lowest position they are not exposed to the air. Consequently, a relatively short time is needed to "warm up" the motors. The fuel system, consisting of gear pump and gravity tank, is simple and reliable in operation. A definite attempt has been made to reduce the fire hazard to a minimum by keeping all fuel lines away from the cabin and having them well protected where they enter the nacelles.

The general characteristics and specifications are as follows:

Overall length	49 ft. 10 in.
Overall height	13 ft. 6 in.
Span, upper wing	69 ft. 0 in.
Chord, upper wing	10 ft. 3 in.
Chord, lower wing	5 ft. 0 in.
Wing section (Modification of Gottingen)	436
Incidence to thrust line	4 deg.
Total area of wings (including ailerons)	992 sq. ft.
Horizontal stabilizer area	58 sq. ft.
Elevator area	50 sq. ft.
Rudders (2 balanced), total area	38 sq. ft.
Weight empty (with water)	7775 lb.
Specified useful load	4225 lb.
Specified gross weight	12,000 lb.
Wing loading	12.1 lb. sq. ft.
Power loading	15.0 lb. hp.
Propellers: Diameter	10 ft. 4 in.
Pitch	5 ft. 10 in.

Several modifications will be made in the construction of the new Sikorsky biplane shortly to be commenced. The length of the top wing will be increased while that of the lower will be decreased. Single pair of interplane struts will be employed on each side. The cabin will be larger to accommodate additional freight, while the pilot's cockpit will be mounted forward instead of aft of the cabin. Other improvements will include the fitting of efficient engine silencers and the placing of the radiators in an inclined position below and in front of the engine.

A total of 70 flights have been made in the present machine without a single forced landing or breakage of any kind. The number of passenger-miles covered to date represents a distance equal to one and a quarter times around the globe.

The ability of the Sikorsky biplane to fly, climb and be under full control with only one of its motors functioning is a particularly noteworthy feature and increases the factor of safety considerably. When loaded with 14 passengers in a recent demonstration flight, one of the Liberty engines stopped on the take-off climb about 60 ft. from the ground. By opening out the remaining motor the machine continued its journey, making a wide circuit and landing safely, being under perfect control the whole while.

Tests Show Drop Center Rim in Favorable Light

IN response to an inquiry concerning the relative weight and performance of wheels equipped with drop center and standard form of rims, an engineer with a well known manufacturer of passenger cars who has been conducting tests with equipment of this character writes us, in substance, as follows:

Weights of standard wire wheels with 20-in. base taking 6.20-in. balloon tires and drop center rims on wire wheels taking the same size tires are as follows:

> Standard wire wheel manufactured by the Wire Wheel Corporation of America; weight of front wheel with 6.20-in. tires, hub cap and brake drum, 90¼ lb. Weight of front wheel, with drop center rim, 6.20-in. tire, hub cap and brake drum, 78¾ lb. Weight of standard rear wire wheel, with 6.20-in. tire, hub cap and brake drum, 92 lb. Weight of wire wheel, with drop center rim, with 6.20-in. tire hub cap and brake drum, 80½ lb.

It will be noted that there is quite a difference in favor of the drop center rim type wheel.

We are not contemplating adopting drop center rims until our tests have shown conclusively that there is enough advantage to be gained by the use of this type of rim to warrant a change in production.

We have not had any trouble with tires coming off the rim at high speed when suddenly deflated. We have made tests to determine what happens under this condition and our experience was that the tire would stay on the drop center rim better than on the conventional type. This may be a little surprising, in view of reports that have been made regarding tires coming off, but we went through this work on our own car very carefully and have convinced ourselves beyond any doubt that our conclusions are correct.

Our tests so far have shown that drop center rims give a little more stability to the tires, and we are somewhat inclined to think that they help to eliminate shimmy, but we cannot yet form definite conclusions.

You're the Doctor

WHEN the car owner says to the repairman "you're the doctor," he is putting the responsibility up to the authority for his case. In the final analysis what the authority says goes.

The car owner may have his likes and dislikes, his prejudices and beliefs, but in the end he puts the things up to the man who is responsible for the job.

Reaching the trade through the trade press is reaching the user through his adviser.

Just Among Ourselves

Foreign Output Is on the Upgrade

PRODUCTION of automobiles in foreign countries has been going up steadily for the last few years. Nobody has any accurate figures on it, of course, but according to the best estimates we can get, automobile production outside the United States for the last three years was about as follows:

1922	300,000
1923	420,000
1924	450,000

These figures include Canada, but exclude foreign assemblies of American cars. It is often said that automotive development abroad is about ten or twelve years behind that of this country. These figures tend to bear out that idea. United States' output was 378,000 in 1912 and 485,000 in 1913. The foreign total shows, of course, that nothing like quantity production has been achieved in most European plants, but it is interesting to note that at least one British concern has a production schedule for 1925 which calls for an output exceeded by only seven American concerns last year.

Commercial Aviation Comes to the Front

THE automotive industry seems destined to play a more important part in the development of American commercial aviation than any other group. That the recent military arguments and general discussions of American aviation have tended to stimulate interest in this form of transportation cannot be denied, regardless of the merits of the various charges and countercharges which have been presented. The recent activity of the Ford interests is another powerful factor in generating popular interest and assistance. Reliability runs in the next few years may serve to demonstrate to everybody's satisfaction the fundamental safety of air travel. A large part of the current stimulation of aviation activities is coming from men directly or closely associated with the automobile business for a number of years. It is fitting that the newest form of transportation should get its chief assistance from its older brother, since, basically, both exist to perform different parts of the same service.

"Car Shortage"— How Long May It Last?

"CAR shortage predicted" has been a rather frequent headline in the automotive news for several weeks. In accepting the possibility of a car shortage in April or May the executive who is playing safe will look very closely at the situation before he decides that such a shortage is going to be more than temporary. Dealers haven't stocked enough cars this spring in many lines, it is true. They have reacted very far from their 1924 experiences. But there is no basic reason to believe that the automobile industry hasn't more than enough capacity to build all the automobiles the public is going to want in 1925. Some manufacturers may find difficulty in supplying the demand for their particular make of vehicle, but it's our guess that these will be a small percentage of the total.

Work and Play in the Coming Months

JUST the same, "spring is here," and sales prospects look pretty darned good. In fact, business seems likely to pick up to such an extent that the Tigers and the Indians will have to get along without so much automotive patronage this year—everybody will be busy making and selling cars. Considering the amount of golf that has been played in the South this year, there ought to be a lot of good early season scores on Northern links. And right now is when the golf bugs have it on the tennis players. The former can get out about a month ahead of the latter—but the relative exertion at the end of the season is about the same at that. By the way, we are in a position to deny definitely the rumor that drawing for show spaces is to be abandoned next year and space allotted on the basis of golf scores made by presidents of the various companies during the coming season. It finally was decided that there is such a thing as trying human nature too far.

He'd Be a Good Man to Find

AFTER reading Charles E. Hughes' description of a truly Christian character, we've about decided that being a successful automotive executive requires nearly the same qualifications as does being a truly Christian character. Here's what he said, anyhow; you can figure it out for yourself. "A truly Christian character is revealed in a balanced life. Faith without credulity, conviction without bigotry, charity without condemnation, courage without pugnacity, self-respect without vanity, humility without obsequiousness, love of humanity without sentimentality and meekness with power. That is our ideal." Not a bad outline of the kind of fellow you'd like to have working for you, regardless of his religion or lack of it.

N. G. S.

Motor Industry Fares Well at Hands of 68th Congress

Survey of legislation enacted during past two years shows many bills beneficial to automotive owners and manufacturers. Outlook for future bright.

By H. L. Cobb

THE two-year legislative life of the Sixty-eighth Congress of the United States has ended, and with it a period of notable achievement in the form of constructive legislation designed to benefit the nation's 17,500,000 car users, and through them the country at large.

Few sessions of Congress have written less legislation in recent years than did the Sixty-eighth. There were enacted into law, but 631 bills out of 18,334 bills and resolutions introduced, yet among the measures finally signed may be listed as relating to the automotive industry, the following:

Reduction in the discriminatory motor excise taxes.

Further appropriations for Federal highway aid.

Authorization of official delegation to attend Pan American Road Congress.

Ratification of the commercial treaty with Germany.

Appropriations for investigations into rubber production.

Extension of provisions of Dyer Anti-Theft law.

THE automotive industry, as a whole, deserves considerable credit for the attitude which it has taken in regard to influencing legislation favorable to its interests.

It has not maintained an active "lobby."

As this article points out, in the passage of the Federal Aid Act, for instance, not a single representative of the industry appeared before the committees nor were any active steps taken to arouse public sentiment for the measure.

Appropriations for Automotive Division, Department of Commerce.

Appropriations for automotive research by Bureau of Standards, Department of Commerce.

Continued distribution of war material to highway departments.

Aside from this affirmative action, scores of bills were rejected which would have tended to impose artificial or unsound restrictions upon car users, and in at least one noteworthy instance the constructive action of a committee was sufficient to prevent unreasonable enforcement of an existing law. This was when the House Committee on Merchant Marine and Fisheries voted 14 to 2 to postpone the objectionable Section 28 of the Merchant Marine Act.

While representatives from the industry played a large part in some phases of this legislation (always, however, through their executives and in a public campaign), an outstanding feature of the sessions was that the industry had practically no part in the larger appropriation measures affecting the motorist.

In the passage of the Federal Aid Act, for example, with its authorizations of $75,000,000 annually for two years for main highways, and $7,500,000 annually for two years for forest roads and trails, not a single representative of the industry appeared before the committees nor were any active steps taken to arouse public sentiment for the bill.

Heeding a National Demand

Federal Aid legislation was passed by the Congress in response to a genuine, deep-seated, national demand which came to the Senators and Representatives from their contact with their own constituents and through their own observations of the nation's needs while driving in their districts. It came from Governors and State and local officials, from women, farmers and business men alike, and while there was heard a rumble of protest from Connecticut and Pennsylvania and New York, whose Senators still persist in the fetish that the East pays the nation's tax bill, the vote was decisive, as it always has been since Federal Aid began. Incidentally, the funds made available are for the fiscal years 1926 and 1927.

The drive for a reduction in the Federal excise taxes was a coalition affair participated in by all of the representatives of organized motordom and officials of the great national farm organizations, who were directly interested because of the fact that nearly one-third of the cars of the country are used by farmers.

Refused favorable consideration by the majority party, the proponents of reduction carried their fight to the country, where they secured an enormous support, and in the closing hours of the tax debate the House reduced the levy on tires, parts and accessories from 5 to 2½ per cent and exempted all trucks having a wholesale chassis value of less than $1000 and all truck bodies of less than $200.

The Senate later went a step further, entirely eliminating the levies on tires, parts and accessories, but these were restored in conference and consequently remain on the statute books at 2½ per cent.

While the victory was not large in actual sums saved

when taken in comparison with the total revenues derived by the Government from these levies, it was large in its portent for the future, constituting as it did at the finish a clean-cut recognition of the motor industry's contention that these Federal excise levies, like all other war-time taxes, are an unfair burden which should be removed as rapidly as revenue needs will permit.

The fight on these sections will be renewed at the next session and with the public statements of the administration leaders, Senator Smoot and Congressman Green, that the taxes should be eliminated, as starting points, the motorist are hopeful that the time of final elimination is not far off. In seeking this objective, however, the point is not lost sight of that there are other excise taxes still on the books which are equally obnoxious to those who must pay them. Nor is it forgotten that the first principle of taxation is to leave those levies on the law books which create the least resistance.

The appeal for ratification of the German commercial treaty was another interesting instance of the response which Congress usually gives when there is a genuine need for sound legislation. Incidentally it affords an excellent example of the legislative methods employed by the industry.

Caught in the manifold intricacies of international political debate and circumlocution, the treaty, which was designed as a model from which similar instruments of foreign trade might be negotiated with other nations, was pigeon-holed some years ago. With the resumption of trade with Germany, it became evident that the motor and other exporting industries of the country would suffer unless action were taken. Consequently, a delegation headed by John N. Willys of the National Automobile Chamber of Commerce came to Washington. Officials of the Departments of State and Commerce and the Tariff Commission were consulted and then the question was taken up with members of the Foreign Relations Committee.

The Chamber of Commerce of the United States, the American Meat Institute, the Tanners Council, the American Export Manufacturers Association and other organizations pressed for relief, each in their own way. Secretaries Hughes and Hoover were summoned before the committee, the treaty was reported out and passed.

The action may fairly be said to constitute the first step in the development of an American foreign trade policy which will undoubtedly be followed by others as Congress reconvenes.

Road Congress Important

While the resolution authorizing an official delegation to attend the Pan American Road Congress at Buenos Aires nearly failed of passage because of its comparative unimportance from a general legislative standpoint, there are many who look upon it as likely to have more far-reaching consequences than any of the other legislation affecting motor use.

The bill authorizes the President to appoint a commission to attend the conference, which is an outcome of the "experiment in neighborliness" undertaken when the Pan American Highway Commission was invited to survey our highways last May. En route the commission will meet highway officials in Peru, Chile, Brazil and Uruguay, and the hope of the contributors to the event held here is that the contacts so established and the friendly interchange of highway practices and policies so made possible, will result in an immediate quickening of highway development within and between the countries of the Pan American Union.

The appropriation for an investigation in sources of rubber supply was made upon the recommendations of Cabinet members and was followed by intensive investigations by the Departments of Commerce and Agriculture. This subject is still under review and has developed much fundamental data of importance from the standpoint of economic welfare and national defense.

The appropriations for the work of the Bureau of Foreign and Domestic Commerce and the Bureau of Standards enabled continuance of the basic economic and physical research which is being done by the department and which is too well known to require more than passing notice here.

WHILE the industry's victory in the matter of tax reduction was not large in actual sums saved when taken in comparison with the total revenues derived by the Government from these levies, it was large in its portent for the future.

This was because it constituted at the finish a clean-cut recognition of the motor industry's contention that these Federal excise levies, like all other war-time taxes, are an unfair burden which should be removed as rapidly as revenue needs will permit.

The amendments to the Dyer Anti-Theft Act, which covers the punishment of criminals caught stealing cars in interstate commerce, broaden the provisions to include penalties for thefts from common carrier motor vehicles, a needed change in view of the increasing uses of the highways for interstate purposes.

One of the last acts signed by the President was the Reece-Capper bill, which provided for the allocation of 100 tractors and 1000 motor trucks from the War Department to the Department of Agriculture for use in highway development. This is the last of a series of measures of this type which were initiated shortly after the end of the World War. Up to the end of the last fiscal year, June 30, 1924, there had been 35,395 motor vehicles, most of them trucks, so distributed, aggregating almost $97,000,000 in value. Spare parts valued at $23,500,000 and other road equipment bring the value of the entire allotment to $241,000,000.

In addition to these bills, there were several small bills providing for the purchase of motor equipment in small lots here and there by various departments. Incidentally, Congress joined the gas tax adherents by passing a two-cent levy for residents in the District of Columbia.

Passing to the "look ahead" stage, it may be anticipated that taxation, further foreign relations acts and railroad transportation measures will be the chief issues under consideration at the next session directly affecting the motor industry.

In addition, however, the question of Federal motor regulation will be considered. The recent Supreme Court decisions have apparently left a limited field of motor vehicle operation outside the range of State control and there will unquestionably be pressure for legislation designed to cover this situation, either through direct Federal control or through legislation permitting the States to act.

World Buying Power Is Increasing

Greater Foreign Trade Bound to Result, Says Klein

PURCHASING power has been increased all over the world. In most countries where competition for foreign trade is keen the greatest demand is for those newer products of industrial ingenuity which have been the particular forte of American manufacturers—moderately priced automobiles, motion picture films, labor-saving machinery, ready-made clothing, electrical specialties, office equipment, etc.

Consequently the foreign trade situation is bright for American manufacturers in general and for builders of these newer products in particular, despite the fact that the struggle for business is growing sharper each year.

These were some of the chief ideas embodied in a talk by Julius Klein, director, U. S. Bureau of Foreign and Domestic Commerce, to the American Manufacturers Export Association last week.

Commenting on the probable effect of foreign competition, Mr. Klein said:

It is well to remember that this is by no means the first instance of vigorous competition overseas. The period immediately before the war was marked by an equally intense export effort. Then we were not only holding our own, but in such highly competitive areas as the ABC countries of South America we were rapidly overtaking our two rivals.

The fundamental question which lies at the bottom of any accurate appraisal of the present competitive situation is not so much the problem of the relative strength of the leading participants in the contest as it is in the probable expansion of the purchasing power of the more highly competitive markets.

If we examine carefully the more alarming prophesies as to the dangers to our export trade from intensified European competition, we find that they proceed in almost every case from the assumption that the trade of the competitive areas has already reached a point of nearly complete saturation and that the issue is simply one of the relative strength of the three leading contestants as to which will gain a predominant position.

This totally erroneous deduction presumes a rigidity of the standards of living in these economically "new" lands overseas, which is so profoundly at variance with the actual conditions as to be almost absurd.

If any one outstanding economic or social phenomenon has been demonstrated with irrefutable conviction throughout the world since 1918, it has been the truly astounding capacity of the human animal not only for recovery from the profoundest shocks, but for improvement and aspirations toward higher levels of comfort and well-being entirely beyond any expectations of a decade or two ago.

It is well to remind those who fear that the import capacity of these competitive markets is rigid and strictly limited that the total import purchases of Latin America, Asia, Oceania and Africa were well over $6,000,000,000 last year, which was more than double the annual average of 1910-13.

"FUNDAMENTALLY, the issue between the American exporter and his rival would seem to be one of whether quality or cut prices should prevail.

"As between the two there is to be no question as to the ultimate decision of the American merchant.

"A strict adherence to those high standards which long have given American wares their standing in foreign markets would seem to be the only foundation for a lasting edifice in our foreign trade."

—*Dr. Julius Klein.*

The significant feature from our point of view of this stimulated and greatly expanded purchasing power in the competitive territories is the fact that its requirements are in a large measure for those newer products of industrial ingenuity which have been the peculiar forte of American manufacturers—moderately priced automobiles, motion picture films, labor-saving machinery, ready-made clothing, electrical specialties, office equipment, etc.

America Gains on Rivals

If we examine the actual figures of the relative status of the three leading trade rivals in representative competitive markets, the situation is far from discouraging for our exporters. Taking the three most important South American countries, we note that in 1913 the United Kingdom easily led with a contribution of 29.7 per cent of their imports. Germany came second with 19.17 per cent; and the United States was third with 13.5 per cent, although gaining rapidly on each of the others. By 1923, however, the situation was entirely changed, the United States and the United Kingdom being practically even with 24 per cent each, with perhaps a slight advantage in favor of the latter because of the heavy British interests in the Argentine; Germany has fallen far behind with about 13 per cent as her share. In other words, so far as the leading South American markets were concerned, the United States had nearly doubled her relative strength.

In the three leading Far Eastern markets a similar transformation had taken place.

A further fear often has been expressed that the expansion of native manufacturing industries in these countries might curtail imports of manufactures not only from the United States but from Europe as well. While there can be no doubt that in many instances, as for example, in the textile trade of the Far East, native industries might replace imports any such local industrial development will not only stimulate the importa-

tion of machinery and supplies, but will directly improve the purchasing power of the native populations and thereby encourage the importation of a higher class of foreign wares—a development which will carry peculiar significance for the quality manufactures of the United States.

One of the most significant and promising phases of our relationship with these economically "new" countries is the amazing growth of our purchases of raw material from them, which increased from an annual average of $734,000,000 during the five pre-war years to nearly treble that figure, or $2,112,000,000 in 1924.

The establishment of such formidable credits in this country by raw material producers in Asia, Latin America, Africa and Oceania is bound to have a profound effect upon the prospects of our sales to them.

The steady advancing prosperity and growth of productive capacity within the United States is one of the best indices of our competitive powers in international commerce. We hear much of mass production and of its vast powers in determining competitive ability, but we do not always realize the tremendous advantage which the United States actually has in this particular connection.

Fundamentally, the issue between the American exporter and his rival would seem to be one strictly of whether quality or cut prices should prevail. As between the two there is to be no question as to the ultimate decision of the American merchant or manufacturer. A strict adherence to those high standards which have long given American wares their standing in overseas markets would seem to be the best, and, in fact, the only foundation for a lasting edifice in our foreign trade. It is quite probable that this may mean a loss in certain lines and trade centers, but there is some comfort in noting that European price cutting seems to be decidedly on the wane.

Europe Needs Capital

There can be no doubt that the recovering European industries are in need of capital, but it can be frankly questioned how much of the amounts sought are desired for legitimate purposes and how much as a means of satisfying the obsession for excessively long credit terms to their customers which was so conspicuous a feature of pre-war continental, and particularly German, exporting.

Long term credits have a well-recognized place in all business, whether export or domestic. The difficulty lies in their proper administration.

In this field it might be well to dispose of the absurd fiction that American firms are amateurs in the matter of proper credit extension. For nearly two decades all sober-minded and well-informed European exporters have admitted the superiority of long-time credit systems of such well-known American lines as agricultural implements, sewing machines, etc.

Let us leave the extraordinary risks of price-gambling to our competitors and adhere to those sound principles which have always been the basis of successful merchandising at home and abroad—good quality, just terms, implicit compliance with commitments on delivery and development of the best production technique. Let us, above all, keep our heads and not be stampeded by any sudden or momentary shift in the trade current or by the temporary advantages of our competitors.

New Swiss Tariff Is Approved

THE Swiss Federal Council recently approved the message to Congress concerning the Federal general tariff law. The duties now in force in Switzerland went into effect July 1, 1921. This tariff was not conceived as a bargaining tariff but rather was adjusted to meet the economic needs of the country. When this provisional tariff was submitted, Congress announced that as soon as possible it would take up the formulation of a new general tariff.

Switzerland claims that it has been compelled by European tariff politics to go over gradually to a type of tariff generally referred to as a bargaining tariff. The plan consists in adopting a general tariff imposing very high duties which then are reduced again through the medium of commercial treaties. It is plainly evident from the motivation of the present tariff law that it is intended to serve as a weapon in the coming negotiations relative to commercial treaties. The view is expressed there that the next few years probably will see a further development of the economic consolidation of Europe, and thus make it possible to again enter into long term treaties. Switzerland must be prepared for this development, since most of the neighboring countries either already have adopted new general tariffs or are working upon them. The provisional tariff of 1921, now in force, does not constitute such a weapon, or at least only an imperfect one.

The new general tariff is to remedy this situation and serve as the basis upon which Switzerland will attempt to regulate its commercial relations to other countries for the next few years. Following are the new rates covering automobiles and parts (not yet in force):

Motorbicycles and tricycles, 180 francs per 100 kg.; automobile chassis without body, of less than 3540 lb., 70 francs per 100 kg.; over 3450 lb., 180 francs per 100 kg.; bodies of all kinds, finished or only partly finished, 300 francs per 100 kg.; complete cars weighing less than 4840 lb., 120 francs per 100 kg.; others, 180 francs per 100 kg.; ignition apparatus, and starters, 300 francs per 100 kg.

A TOTAL of 238,153 storage batteries, representing a market value of $2,869,851, were exported by American manufacturers in 1924. This compares with 163,840 batteries, appraised at $2,341,590, exported in 1923. The biggest markets for American batteries proved to be Argentina, which led the list with purchases totaling $348,313; Canada, with $326,815; Australia, $238,116; Brazil, $224,964; Belgium, $202,663; England, $196,248; British South Africa, $132,667; Cuba, $140,731; Denmark, $137,876; New Zealand, $126,764; British India, $117,336; Mexico, $99,214; Italy, $70,862.

According to the figures, American batteries in 1924 were shipped to practically every section of the world, ninety-nine different countries or sections appearing in the list of users.

Here and There in Foreign Markets

By special arrangement with the Automotive Division, Bureau of Foreign and Domestic Commerce

French Moving Into Spain

INCREASED activity of French automotive and tire manufacturers in Spain is caused in a large way by heavily increased taxation in France, where industries hitherto have been practically exempt from oppressive taxation and regulation. During the last year and a half various foreign companies have been acquiring property and manufacturing plants in Spain. The main cause for this increased interest here is thought to be a general desire not only to establish foreign products in this country, but also to obtain a more advantageous entry for these products into Latin-American countries.

Tire Casing Exports

AUTOMOBILE casing exports from the United Kingdom in January numbered 54,788 valued at £134,455, which at the average exchange rate of $4.78 for the month figures to $642,695 or $11.73 per casing, Assistant Trade Commissioner William M. Park at London cables the U. S. Department of Commerce. The United States exported about 113,000 casings in January, and Canada about 60,000, while French exports are estimated at approximately 172,000 for the month. Statistics of January exports from Italy, Germany, Belgium and Japan are not yet available.

Polish Imports Grow

ACCORDING to the recently published returns of Polish imports for the year 1924, there were imported into Poland during the past year automobiles to the amount of 3528 metric tons valued at $3,304,500. The previous year the value of the automobiles imported was $2,580,000. During the summer months the imports lagged, but they increased again during the fall and in December the trade was quite brisk. The majority of the cars imported were of the smaller types but some large trucks are also included in the imports.

Russian Government in Market

THE Soviet Government of Russia has made an appropriation of 3½ million roubles, of which 80 per cent is for the purchase of motor trucks and 20 per cent for the purchase of motor buses and motorcycles. The vehicles must be specially adapted for use on poor roads. It is reported that a sum of 9 million roubles has been set aside for road improvement in Russia during 1925.

Panama Lowers Bus License

THE primary cause for the increased use of motor buses in Panama, particularly in Panama City and adjacent portions of the Canal Zone, is the reduction in the license fee, which was formerly ten dollars per month for each motor vehicle for hire carrying more than ten persons. "About Jan. 1, 1924," reports Consul George Orr, "this fee was reduced to four dollars per month for all automobiles used for commercial purposes including buses and taxicabs. The Government of the Panama Canal Zone has given notice that commencing Jan. 1, 1925, no applications for additional bus lines will be considered until after the issuance of specific regulations governing their operation under executive order."

Chilean Situation Unfavorable

POLITICAL disturbances and conditions of exchange in Chile have resulted in one automobile concern postponing two monthly shipments and another has canceled its monthly shipment, Commercial Attaché Ackerman at Santiago advises. It is noted that most importing houses are increasing the percentage of cash paid with order and are limiting terms of sales to short periods.

Low-Priced Cars Slow in Cuba

CUBAN automobile sales for the quarter ending March 1 showed a continued decline for low-priced cars. The sales of medium-priced cars show a slight increase this quarter over the preceding one, while sale of higher priced cars remain the same. In the case of light trucks, an increase of no less than 30 per cent is expected in sales during the quarter, A continued strong demand is anticipated in this line.

Czechoslovakia's Imports for 1924

DURING 1924 there were imported into Czechoslovakia 1226 automobiles and chassis, of which 505 came from Italy, 316 from France, 197 from the United States, 77 from Austria, 54 from Germany and 26 from England.

Books for the Business Bookshelf

UNDOUBTEDLY much more theoretical or analytical work has been done in connection with aircraft than with any other type of automotive engines. One good reason for this is that in aircraft engines every ounce of unnecessary material must be eliminated and it is therefore of the highest importance that strength calculations be made with the highest possible degree of accuracy. Another factor that probably has had its influence in this connection is that, the aircraft engine being a highly refined piece of mechanism, its design is a rather alluring occupation which—especially during the war period—attracted some of the best talent in the internal combustion engine field, and the contraction of the aircraft industry after the war gave many of the engineers who had been engaged in this line of work the time and the opportunity to write for publication.

The above remarks are prompted by the recent appearance of a volume on Engine Dynamics and Crankshaft Design, by Glenn D. Angle (Airplane Engine Encyclopedia Co., General Motors Building, Detroit, Mich.). It is stated in the book that this is the first volume of a series dealing with various phases of aircraft engine design which the author plans to bring out. Mr. Angle, it may be recalled, was formerly in charge of the design of aircraft engines for the Air Service and therefore has the necessary "background" for an authoritative work.

The two subjects of Engine Dynamics and Crankshaft Design are closely related, because the dynamic forces in an engine are directly dependent upon the general design of the crankshaft, and the crankshaft is so designed as to make it comparatively easy to neutralize the dynamic forces and thus balance the engine.

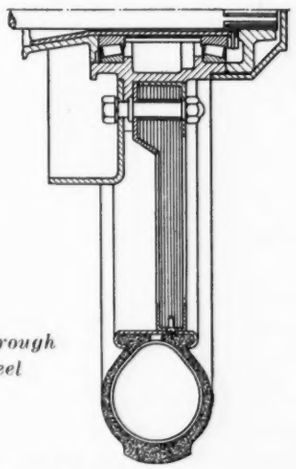
Mr. Angle develops the equations for piston movement, piston velocity, and acceleration by the usual methods and then applies them to the determination of the unbalanced forces in engines with different numbers of cylinders differently arranged. The expressions for the torque on the crankshaft and for the side thrust on the cylinder wall are developed, and the former is applied to all of the different types of engine that have been used in aircraft practice and the results are plotted graphically. The author, confining himself to a narrow field, can cover that field more thoroughly than is done in the average handbook covering the whole of the engine, and the length to which he has gone may be judged from the fact that torque curves are given for the following types of engine: Single-cylinder, two-cylinder, three-cylinder, four-cylinder, five-cylinder, six-cylinder, seven-cylinder, eight-cylinder with equal firing intervals, eight-cylinder with 75 and 105 deg. firing intervals, eight-cylinder with 60 and 120 deg. firing intervals, eight-cylinder with 45 and 135 deg. firing intervals, nine-cylinder, ten-cylinder, twelve-cylinder, sixteen-cylinder and eighteen-cylinder. In the latter type, the author finds, the torque fluctuates by only 3 per cent from the mean.

Closely connected with the subject of crankshaft design is that of balance and this is fully dealt with from the design standpoint, but nothing is said about the various types of balancing machines used to put crankshafts in dynamic balance. Of course, this could hardly be expected, seeing that the title refers to design only. Problems of design, on the other hand, are gone into in great detail, and an attempt is made to calculate the stresses which occur in the different members of a crankshaft, though the author admits that no high degree of accuracy can be expected in such calculations, as these stresses depend upon the rigidity of the crankcase and the rigidity of the crankshaft, both of which are more or less indeterminate. Polar diagrams of bearing loads are shown for several engines and the method of plotting such diagrams is explained. Types of bearings used in airplane engines and methods of fitting the bearings in aircraft practice are also dealt with.

While the treatment has direct reference to aircraft engines only, in which field the author's experience has been acquired, the treatment of the subject of dynamics applies equally well to automobile and other types of internal combustion engine and the design of crankshafts for automobile engines also is quite similar to that of crankshafts for aircraft engines, though more different types of engine are used than in automobile work.

The treatment is of a nature that appeals to engineers, for though the book is rather mathematical, as required by the subject covered, the mathematics is of what might be called a practical nature, put forth to prove physical facts, rather than for its own sake, as sometimes appears to be the case. Typographically the volume is also a very creditable production.

Web Wheel with Fiber Disk



Half-section through web disk wheel

A DISK wheel with a disk of fibrous material for which the advantage is claimed that it prevents resonance, has been developed in England. The disk of the wheel is said to resist drumming and the amplification of noise due to the transmission parts. Other advantages claimed for the wheel are light weight, great resilience, accessibility of the valve and interchangeability with artillery wheels when desired.

The centers may be made either plain or dished, and equally satisfactory results are obtained with both. While shown with a clincher rim, the wheel may also be made with a straight side rim. We understand that these wheels have been manufactured in England for four years, the manufacturers being the Web Wheel Co., Ltd., 26 St. Petersgate, Stockport. Patents on the design have been issued in different countries, including the U. S.

Recent British Tests Throw New Light on Carburetion Requirements

4000 carbureter patents granted in Great Britain show extent of work for greater fuel economy. Average English gasolines have a molecular weight of 113, about the same as that of octane.

IN the United States, 1800 carbureter patents have been granted, while in Great Britain the total has reached 4000, half of these English patents having been granted since 1916.

These figures show clearly that an enormous amount of inventive effort has been expended in carbureter development. As a result of that effort great strides have been made toward more economical utilization of motor fuels. In a paper on "Carburetion," read recently before the Institution of Automobile Engineers, D. Finlayson, after giving the above figures, discusses particularly motor fuels now marketed in England and properties of hydrocarbon fuels in general. The chief points of his discussion are digested in the following paragraphs.

If a fuel contains no elements besides carbon, hydrogen and oxygen the theoretically correct ratio between fuel and air is given by the equation

$$r = 0.116\,[C + 3\,(H - \tfrac{1}{8}O)],$$

C, H and O being the percentages of these constituents by weight. In the case of hydrocarbon fuels this equation simplifies to $0.116\,(C + 3H)$. If the hydrocarbon fuel has the chemical formula C_aH_b the fuel-air ratio is conveniently given by the equation

$$r = 0.292 + [0.2305/(4 - b/a)].$$

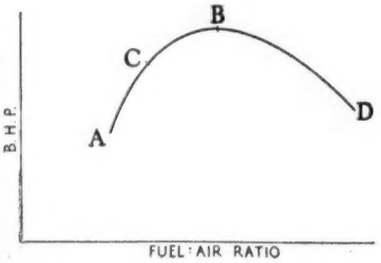


Fig. 1—Variation of power with mixture ratio at constant speeds

For a long time carbureter engineers held to the theory that a carbureter should furnish a mixture of constant strength throughout its range of operation, but this has now been disproved. Consider what happens when an engine using a liquid fuel is running on the test bench at fixed throttle opening and the mixture strength is varied by means of a gasoline needle valve, the speed being kept constant by variations of the load. If both air and fuel are measured and the results are plotted, a curve of the general form shown in Fig. 1 is obtained.

In a test of this kind, with constant throttle opening the air consumption varies only slightly with change in mixture strength, and may be considered constant. If the mixture strength is reduced below A, or increased beyond D, running is impossible. Near either A or D running is apt to be erratic, and occasional missing may occur. As the mixture becomes richer than A or leaner than D, the power increases and is a maximum for some intermediate ratio B. Some distance to the left of B, that is, on the leaner side of the curve, lies the chemically correct mixture C. Also on the same side of the curve lies the mixture giving the maximum fuel economy.

At the laboratories of the Research Association of British Motor and Allied Manufacturers an investigation on the effect of changes in fuel mixture ratio on the maximum power output and the thermal efficiency has been made on a single cylinder 3.5 hp. engine with a compression ratio of 3.86:1. The results obtained were generally in agreement with those obtained by Professors Berry and Kegerreis in this country. That is, the maximum power is obtained from an engine if the fuel charge contains substantially 20 per cent more than the theoretically required amount of gasoline, while the mixture ratio giving the best economy varies with the load, from about 17.25:1 at full load to 12.8:1 at low load.

Ideal Carbureter Characteristics

The author considers that the ideal characteristic for an automobile carbureter would be like Fig. 2. This refers to a mixture the fuel content of which is actually vaporized and uniformly distributed. In case the engine is cold some of the fuel will separate out and run down the cylinder walls and proportionately more fuel then must be supplied to the mixture. Again, if the distribution is poor, excess fuel is required, for the leanest cylinder must receive a charge that is at least ignitable. In many cases the most economical mixture will approach the weaker limit for steady running rather closely and a wider margin will be desirable. If with these weak mixtures prolonged running at nearly full load occurs, valves and valve seats may easily suffer. Moreover, in the absence of special devices to permit the supply of a temporary excess of fuel when rapid acceleration is required, richer mixtures over a great part of the range will be necessary.

The carburetion problem is concerned with more than the mere proportioning of the mixture. For rapid and efficient combustion thorough intermixture of the reactive molecules is required, which can be effected only by complete vaporization of the fuel.

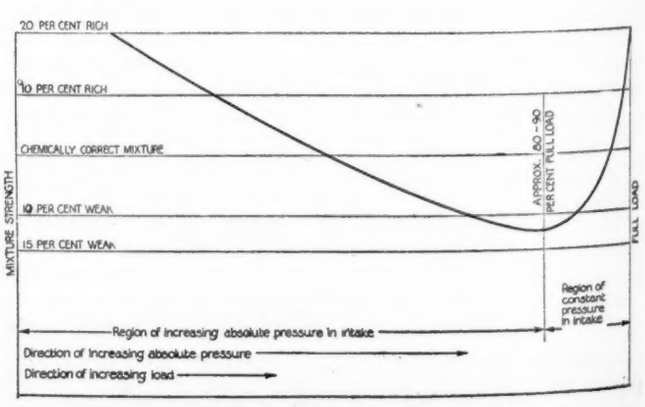

20 PER CENT RICH
10 PER CENT RICH
CHEMICALLY CORRECT MIXTURE
10 PER CENT WEAK
15 PER CENT WEAK
MIXTURE STRENGTH
APPROX. 80 - 90 PER CENT FULL LOAD
FULL LOAD
Region of constant pressure in intake
Region of increasing absolute pressure in intake
Direction of increasing absolute pressure
Direction of increasing load

Fig. 2—Ideal carbureter characteristic

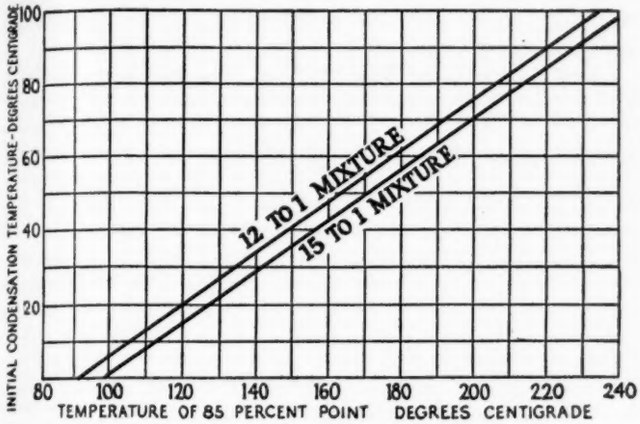


Fig. 3—Relation between dew-points of mixtures and 85 per cent distillation points of fuels

From a knowledge of the vapor pressure-temperature curve and the molecular weight of a simple liquid, such as alcohol, it is possible to calculate the proportions of alcohol vapor and air which can exist at various temperatures and pressures; in other words, it is possible to calculate condensation temperatures or dew points. The same method cannot be applied with ease to mixtures like air and gasoline. Gasoline is a complex mixture of liquids of widely varying volatilities. The ordinary vapor pressure-curve may give information regarding the initial or starting volatility but not in regard to the mean or effective volatility. In the evaporation of a mixed fuel the composition of the liquid and gaseous phases are in general different. To give the necessary information there is therefore required the vapor pressure curve of a liquid of such a composition that the vapor formed from it has the composition of the original fuel.

Experimental determinations of the ultimate composition of representative British gasolines in the Research Association Laboratories have shown that the ratio of hydrogen to carbon atoms ranges from 2 to 2.30, the former being the figure for a No. 1 gasoline high in aromatics and the latter for an aviation gasoline. A good average figure is 2.15. The average British gasoline may therefore be represented by the molecular formula $C_8H_{17\cdot2}$. From this it is found that the apparent molecular weight of the average British gasoline is 113.2. The fractional value 17.2 serves to prevent any misapprehension that the formula $C_8H_{17\cdot2}$ represents any definite chemical compound.

For such a gasoline the proportions by volume of the chemically correct mixture are 1 of gasoline vapor to 12.3 of oxygen or 1 of gasoline vapor to 58.85 of air. When the chemically correct mixture exists with all the gasoline in the vapor phase, the gasoline therefore exerts a vapor pressure equal to 1.67 per cent of the total pressure.

Wilson and Barnard, from experiments made by them, were able to derive the important generalization that the initial condensation temperature of a fuel-air mixture is practically a linear function of the temperature at which 85 per cent of the fuel has distilled off in the ordinary Engler distillation. The relation is shown in Fig. 3.

We are now far from the period when complete vaporization of the fuel in unheated manifolds was a possibility to be considered. The temperatures obtained by rules for the dew point represent limiting conditions only and give no information as to the possible extent of vaporization in the time available. Evaporation is a relatively slow process, unless assisted by high air speed, high temperatures and fine division of the fuel. The rate of evaporation of a liquid in the form of drops is variously stated to be proportional to the surface or to the diameter of the individual drops. Since the mass of a drop is proportional to the cube of its diameter, the rate of evaporation of a given quantity of atomized liquid must be inversely as the drop diameter, or inversely as the square of the diameter. "Atomization" is, therefore, a valuable potential aid to vaporization, but can only be effective when the conditions are such as to allow the finely atomized drops to remain in that condition for a reasonable length of time. In many carbureter designs the preservation of the drop in its original form is not sufficiently considered.

Effect of Atomization

Experimental determination of the effect of atomization on rate of evaporation forms a difficult problem. Klaften, as a result of experimental work on the vaporization of atomized liquids, reached the conclusion that, as regards assistance to vaporization, high air velocity through a throat is of minor importance, in comparison with high velocity through the induction system as a whole.

The behavior of the drops of fuel in the center of the air stream is, however, only part of the problem. Observation through transparent induction pipes has repeatedly shown that in many, if not in most, conditions of normal running, a considerable proportion of the fuel flows along the walls of the induction pipe in the form of a stream. Experiments and calculations, to be of practical value, must, therefore, take the presence of this stream into account.

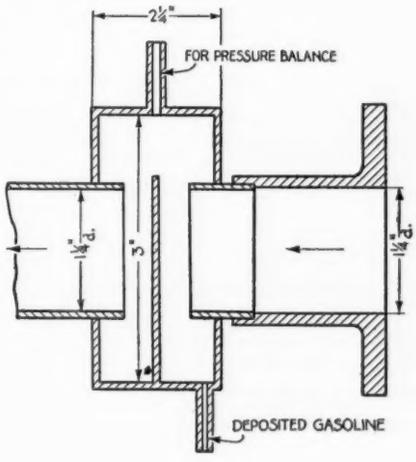


Fig. 4—Fuel trap

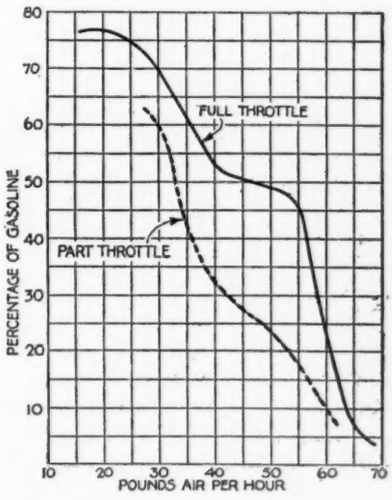


Fig. 5—Proportions of fuel caught

Interesting information on the behavior of a gasoline-air mixture can be obtained by inserting a "fuel trap" between a carbureter and the suction side of a blower, measuring the fuel supplied and the fuel collected by suitable means. A suitably designed fuel trap may be considered to be a severe test of the capability of the mixture to pass freely round induction-pipe bends, etc. The ratio of the fuel deposited in any one trap to the total fuel supplied under any given set of conditions is in general a function of the trap design. The variations in "proportions deposited" when different carbureters are tested with the same trap give some idea of their relative efficiencies of atomization and/or vaporization.

With a fuel trap of the form shown in Fig. 4, it is found

that the proportion of fuel deposited in the trap varies in general with air flow in the manner shown by the full-line curve of Fig. 5, the results being practically identical for a number of different carbureters when tested in the full-throttle position, with air flow in the manner shown by the full-line curve of mixture strength. The proportion deposited with a given rate of air flow diminishes as the throttle is closed, the decrease varying from carbureter to carbureter according to the method of throttle operation. The dotted-line curve in Fig. 5 shows a typical part-throttle result.

Throat Velocity Overrated

The experiments as a whole agree with Klaften's observation on the overrated relative importance of high velocity through a carbureter throat of the usual form, and indicate that to assist the mixture to pass freely round bends, etc., the atomization must be sufficiently fine to allow a considerable proportion of the possible vaporization to take place before the first obstruction is reached. It is easy to imagine a connection between deposition in a trap such as that used in these experiments and the occurrence of crankcase dilution and the passage of fuel through the cylinder in a form unaccounted for by exhaust-gas analysis. The worst conditions are, clearly, idling and slow running under load.

From available data on rate of evaporation from plane surfaces, approximate calculations may be made in regard to the possibility of evaporation of the liquid stream flowing along the walls of the induction system to the engine. The calculations are admittedly inexact but imply that only a small proportion of the total possible vaporization of the liquid stream can take place in the available time under ordinary conditions with unheated manifolds. In the absence of suitable hot-spotting or other system of preheating, a considerable part of the vaporization of the fuel has therefore to be carried out inside the engine cylinder. Under normal conditions, the greater part of the liquid fuel entering the cylinder is probably vaporized during the induction stroke, any residue being vaporized on the compression stroke.

Cold Starting Conditions

Starting from cold is another matter. The temperature of the induction system and engine cylinder may be quite insufficient to allow the possibility of complete evaporation of the fuel in a *normal* charge, and the compression stroke may be more nearly isothermal than adiabatic, thus retarding rather than promoting vaporization. The usual procedure is to supply a large excess of fuel (of the order of twenty times the normal proportion) so that the necessary amount of vapor can be obtained from the lighter fractions, the remaining part passing to the crankcase via the piston clearances, or directly to waste through the exhaust. Of the two evils, the latter is obviously preferable. Clearly, it is desirable that the method used for providing the excess fuel required on starting should not at the same time impair the metering characteristic over other parts of the range.

The presence of a stream of liquid fuel in the induction system is a complicating factor in the problem of carbureter operation. When the engine is running steadily at constant load and speed, the amount of fuel in the induction system remains constant, and the strength of the mixture supplied by the carbureter is the same as that received by the engine, though a number of cycles may occur during the passage of an individual drop of fuel in the liquid stream from the carbureter to the engine. When the load or speed is changed, the equilibrium is disturbed, and fuel has either to be added to, or taken away from, the manifold to restore equilibrium under the new conditions.

During the transition period, the mixture strength supplied by the carbureter no longer corresponds to that received by the engine. It follows, therefore, that while the load or speed is changing, the whole of the induction manifold must be considered part of the carbureting system. To give good acceleration, the strength of the mixture received by the engine need never exceed that of the maximum-power mixture. The function of accelerating wells is to supply excess fuel to the manifold to enable the manifold to supply the correct mixture to the engine.

Efficient accelerating wells assist economy of fuel, as they permit the normal use of mixtures weaker than would otherwise be required.

A.S.T.M. Papers in Book Form

AT the 1924 annual meeting of the American Society for Testing Materials there was held a symposium on corrosion-resistant, heat-resistant and electrical resistance alloys, and the papers read on that occasion, together with the discussions thereon, have now been reprinted in book form. Copies of the book can be obtained from the society, the headquarters of which are at 1315 Spruce Street, Philadelphia, Pa. The papers of automotive interest include one on Characteristics of Material for Valves Operating at High Temperatures, by J. B. Johnson and A. B. Christianson, one on the Carrying Capacity of Ball Bearings Made of Stainless Steel, by Axel Hultgren, one on Some Electrical Properties of High Resistance Alloys, by M. A. Hunter and A. Jones, and one on Characteristics of Some Materials for Base-Metal Thermocouples, by F. E. Bash.

An interesting book on Diesel engines has been published by the firm of Fried. Krupp Aktiengesellschaft, Essen, Germany. It deals with the historical development of the Diesel engine by this firm, which was one of the first to interest themselves in it, and with the present Diesel engines, Diesel engine locomotives for narrow gage roads and various accessories and appurtenances of Diesel engines, such as metal packing for fuel valves and pumps and ignition temperatures testers for engine fuels. Photos and drawings are shown of some of the comparatively small engines built by the firm in the late nineties and of the latest six-cylinder engines for motor ships of up to 12,000 hp., which furnishes a very good illustration of the progress which has been made in this branch of engineering during the past quarter century. The engines are built in both the two-stroke and four-stroke types and something of a curiosity is a single cylinder double-acting, two-stroke engine of 2000 hp., shown direct-connected to an electric generator.

A METHOD for treating aluminum and certain of its alloys so as to eliminate at least a considerable proportion of the dissolved gas and thus reduce unsoundness and pin-holing, is described in a paper presented to the Institute of Metals at its meeting in London by S. L. Archbutt. The process suggested consists in allowing the molten alloy or metal to cool slowly in the crucible in the furnace until it has just completely solidified; it is then remelted and may be carefully stirred, raised to the pouring temperature and cast. Ingotting the metal is not satisfactory, as the ingots cool too quickly and during remelting are too much exposed to the furnace gases.

Hollow Metal Balls Made of Strips and Tubing

Both ferrous and non-corrodible metals used in construction. Press and rolling operations close openings. Methods used in finishing same as for solid balls. Useful in thrust bearings.

AT several of the industrial shows last winter visitors were much interested in the exhibits of hollow balls made of steel and other metals by a new process which has been developed by the Hollow Ball Co., Baltimore, Md.

The process was originally worked out to make it possible to produce metal balls of comparatively low weight and uniform wall thickness for use in ball valves, but various other uses have been found for the product since. It is believed that in the automotive line the balls will find application particularly in thrust bearings. In such bearings the load on the balls, retainers and races is considerably augmented by the centrifugal force on the balls, and since this force is directly proportional to the weight it can be materially reduced by making the balls hollow.

These balls are at present being made of brass, copper, monel metal, aluminum and steel, in sizes from ¼ to 3½ in. in diameter. In the smaller sizes they are made from strip metal and in the larger sizes from tubing. The wall thickness of the finished product is between 8 and 10 per cent of the diameter and uniformity in the thickness of the wall is an outstanding feature. The finished ball is held to within 0.0001 in. of the nominal diameter.

The steps in the manufacture of these balls may be noted from Figs. 1 and 2. In the case of strip brass, annealed material is used. In the first operation the coils are fed automatically to a press, which blanks and draws the cup as shown at A and B, Fig. 1.

In the next step the cup is redrawn in presses, after which the outer edge is trimmed in a special automatic machine equipped with hopper and dial feed. To relieve the strains set up in the press operations, the blanks then are annealed in a continuous rotary gas-fired furnace, after which they are taken to a press for pointing, which leaves the blank more or less oval in shape and with an opening at one end, as shown at D. Another press, which is also automatically fed, is employed to round the blanks as shown at E, this operation being followed by a second annealing.

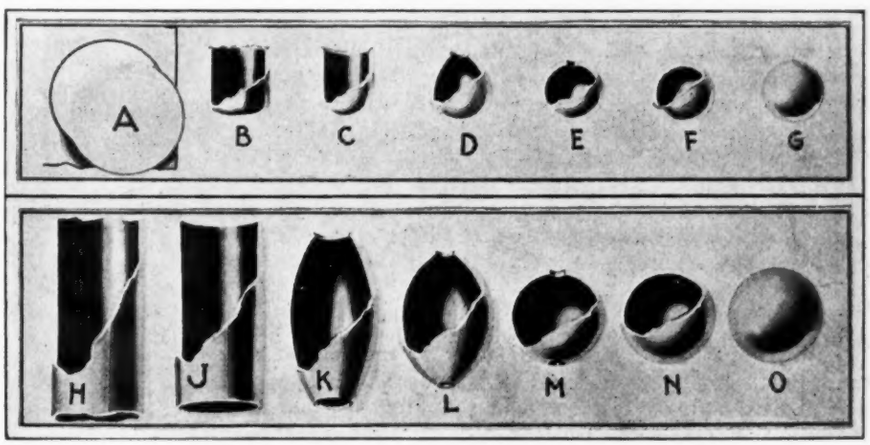
The next step, that of closing the hole, is probably the most important operation, because upon it the success of the entire process depends. A rolling machine of special design is employed. The machine carries two removable alloy steel plates or disks mounted on separate horizontal shafts. One disk revolves and the other is stationary.

A fundamental feature of the disks are matched concentric grooves of compound circular section. Upon the accurate machining and lapping of these grooves the closing of the hole in the blank and the true sphericity of the ball depends.

In operating the machine the hopper is filled with the open balls such as shown at E, Fig. 1, the apertures of which are to be closed. They feed down by gravity through a flexible tube to the inner groove of the plates or disks. The balls then travel around the inner groove, and are then deflected to the next outer groove, and finally, upon completing the circuit, are thrown by centrifugal force through a second flexible tube up into the hopper. This cycle of operation is repeated until the holes in the blank are closed and the balls are truly spherical to within approximately 0.001 in.

As the rolling operation continues and the pressure on the balls is increased, the balls contract in volume, and the excess metal is forced into the opening left by the previous operations until the aperture is completely closed. The rolling operation is then continued until the spinning of the ball causes an interlocking of the metal fibers adjacent to the aperture. Thus there is a mechanical knitting of the metal, the rolling process having a tendency to move the metal fiber from points where it is excessive to points where there is a deficiency.

An advantage which is specially stressed by the manufacturers is that the balls are uniform-walled, which insures inherent balance. After being closed and



Figs. 1 and 2—Stages in the production of hollow balls

rolled, the balls are ground in standard machines by being rotated against an abrasive wheel. They are then polished in tumbling barrels, and inspected and graded in the usual way.

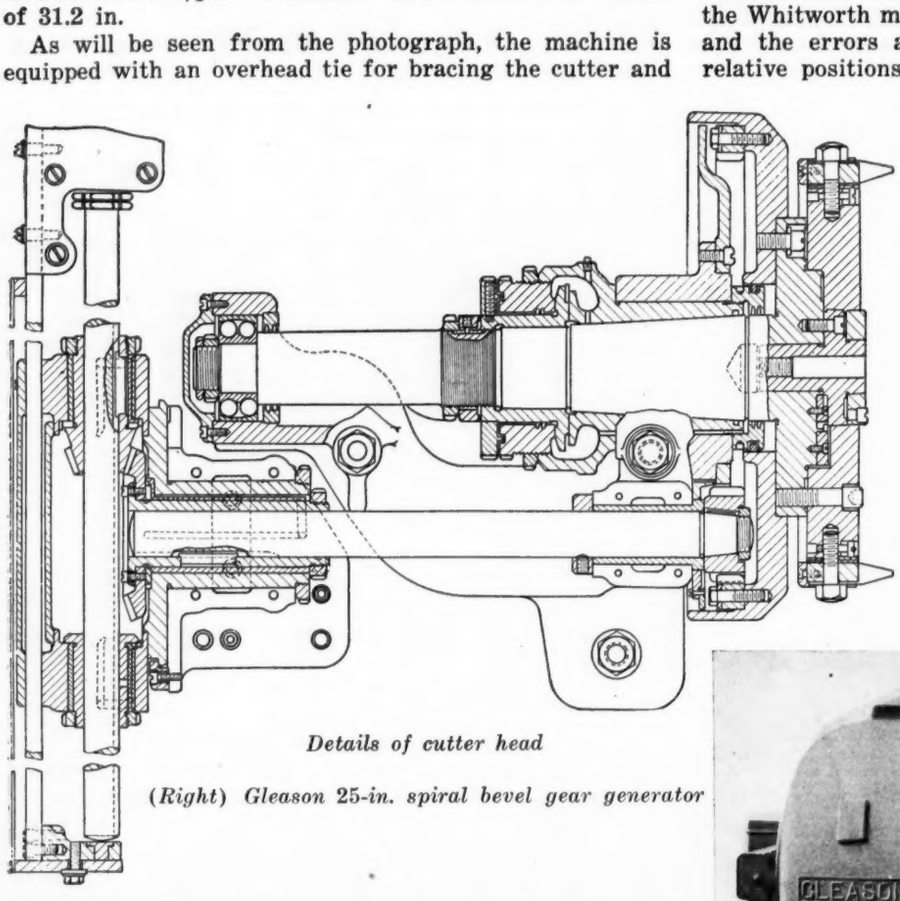
In making balls from tubing, the latter is cut into lengths and then the ends of the cut blanks are tapered as shown at J, Fig. 2, in automatic screw machines. In the next operation, performed by a press, the blanks are pointed or ovalled as shown at K, the larger balls having an additional ovalling operation as shown at L. The blanks are then rounded in a press as in the case of the balls made from strip metal and the finishing processes are also the same.

NEW MACHINE TOOLS

Gleason Brings Out Larger Spiral Bevel Gear Generator

THE Gleason Works, Rochester, N. Y., have placed on the market a new size spiral bevel gear generator, rated at 25 in. The largest gears or pinions which can be cut on this machine are those having a cone distance of 16½ in. This permits gears of an 8 to 1 ratio combination to be of 32¾ in. in diameter and those of 3 to 1 ratio of 31.2 in.

As will be seen from the photograph, the machine is equipped with an overhead tie for bracing the cutter and the work together. The cutter is set in the cradle, running in a completely inclosed housing. This makes the machine exceedingly rigid, and in roughing out cast steel miter gears of 1½ dp., full depth, 4 in. face, teeth have been cut at the rate of one per minute and fifty seconds, with a cutter point width of 0.4 in. This speed was obtained without any distress to the machine.



Details of cutter head

(Right) Gleason 25-in. spiral bevel gear generator

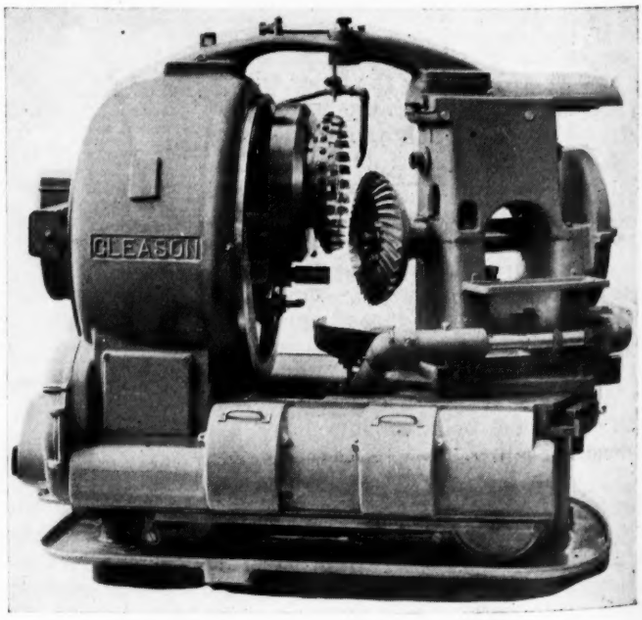
A feature of this machine is the indexing mechanism, which is of the stop wheel type. The index change gears, however, are placed in the constantly moving train of gearing that drives the generating movements. Thus there are no dead gears in the generating train, and great accuracy of indexing and tooth profile is said to be secured.

Another feature of the machine is the design of the cutter spindle. Adjustment for end play and radial play can be made independently, and without dismantling the spindle. Lubricant for the spindle is carried in the spindle bearings, so that there is no chance of any dirt finding its way into the bearings.

The generating roll ratio is obtained by means of change gears, the ends of the train being worm wheels. These worm wheels are split into two pieces and are hobbed by the Whitworth method, in which the hob drives the wheel and the errors are continually halved by changing the relative positions of the two sides of the wheel and rehobbing until there is no mismatching of the teeth when a shift is made.

Cutters of 18, 12 and 9 in. diameter can be used on this machine. The largest pitch for which the machine is recommended is 1½ dp. Lubrication of the cutter head is effected by a unit system which takes care of all points except the spindle bearings, which are otherwise provided for. A separate system, which takes care of all points requiring lubrication from the work spindle, is also used.

Arrangements are made for an ample supply of coolant, which is driven into the work by a geared pump. Gears up to the capacity of the machine have already been cut for use on rail motor cars and heavy auto buses, trucks, and various industrial uses.



The weight of this machine is about 14,000 lb. It can be arranged for either motor or belt drive.

FOR THE INDUSTRY

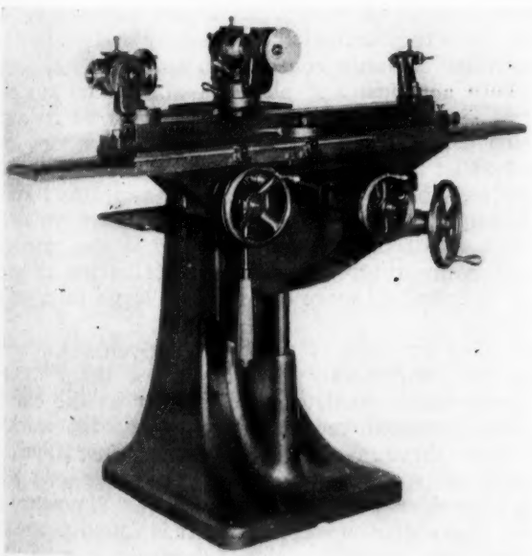
New Universal and Tool Grinder

FOR use in automobile and similar shops the Oesterlein Machine Co. of Cincinnati, Ohio, has brought out a universal and tool grinder known as its No. 2-L. The machine is intended for grinding tools such as gang reamers, boring bars, bridge reamers, taps and similar tools in which large capacity, adaptability and rapid manipulation are desired.

The capacity limits of the machine are 30 in. between centers, 9 in. swing and 7½ in. vertical movement. It is of the milling machine type of construction and planer type bearings are used on the table and saddle.

Table reciprocation is either by hand wheel, through one or the other of two gear reductions, or through a ball bearing lever feed. The lever feed may be engaged at any point so that the operator may use his right or his left hand for table reciprocation. This ball bearing lever feed has also been added to the No. 2 and No. 3 grinders built by the company.

The wheel spindle may be set parallel to the table for plain wheels, or at right angles to the table for cup wheel grinding. Attachments for cylindrical, internal and surface grinding may be used with the machine.



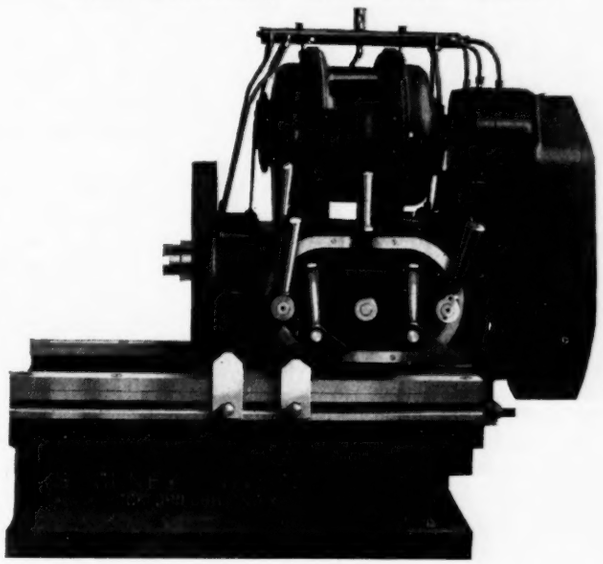
Ohio universal and tool grinder No. 2-L

The "Bench" Rod Cutter

A TOOL for cutting round rods of from ⅛ to ⅜ in. diameter, of any unhardened material, accurately to length and without waste, has been placed on the market by the Bench Machine Tool Co. of 220 North Thirteenth Street, Philadelphia, Pa. It is claimed to be more economical for this purpose than either a screw machine or a hacksaw, hand or power operated.

The tool is equipped with two hardened alloy steel die plates, and the leverage provided is said to make it easy to operate even on production work. Unskilled labor can be employed for its operation, for once the adjustable stop has been set for the correct length all that is necessary is to push the stock forward and pull the lever.

The Stickney Universal Unit



Stickney Universal Unit

A NEW drilling machine known as the Stickney Universal Unit has been placed on the market by the Rockford Drilling Machine Co., Rockford, Ill. With this unit all drilling, tapping, boring, reaming and facing jobs can be performed, hence the description "drilling machine" is somewhat inadequate. The machine is built up for any specific type of job with a universal unit or head, and this is claimed to make possible appreciable savings when jigging up for a different production operation.

Splined shafts are eliminated by mounting the motor on the unit itself. All drive gears are of alloy steel, heat treated, and run in oil. All gears are of the spur type. A keyless type of jaw clutch is incorporated in the design, which is claimed to be free from liability to freeze under heavy torque and comparatively free from wear. A flood lubrication system is installed on the unit, the oil being filtered as it circulates.

Double spindle speeds are provided to make it possible to obtain proper speeds for boring and facing operations. To take care of both drilling and tapping operations, feeds of from 0.002 to 0.250 in. per revolution are provided. For back facing there is a back feed.

A power rapid traverse to and from the work speeds up operations and relieves the operator. High production is facilitated by an automatic control. The gears are said to be of particularly generous size, which permits heavy cuts and feeds and insures the possibility of continuous operation.

Sound Design Is Essential to Successful Quantity Production

British engineer says "originality consists in thinking for oneself, not necessarily differently from other people." Urges designers to learn that principle. Views on continuous output.

A TECHNICALLY sound and continuously saleable article is a necessary basis for quantity or continuous production, according to Frank G. Woolard of Morris Engines, Ltd. Continuous production in itself is no new thing, Mr. Woolard pointed out in a recent paper, for it has been practised for many years in the food, soap, textile and other industries.

Presenting a British view of this development which we have been prone to regard as strictly an American achievement, Mr. Woolard went on to say:

"It is essential for continuous production that the article to be manufactured be standardized, because, with a sufficiency of similar parts that are rarely altered, the mechanism to provide 'flow' can be set up and worked economically," said Mr. Woolard. "Therefore, it is essential that the article to be manufactured should start right and be not only technically sound, but readily and continuously saleable. It will then stand the test of time with only minor modifications.

"Standardization or the reverse is dependent upon the general policy of a company and upon the sales department, which so greatly helps to shape the policy. If the public are encouraged to look for a change of model year by year, there can be no standardization and no really large or continuous production.

"It is pertinent comment that, on the one hand, the car which is universally acknowledged to be the finest, and on the other, the car of which production is counted in millions, have not changed their models for many years, though they have, of course, been modified considerably. To make annual radical changes is entirely opposed to the scientific method of altering one unknown factor at a time, and it makes reasonable evolution impossible. The world's finest car has evolved toward technical perfection; the world's greatest-quantity car has evolved toward perfection in administrative and manufacturing economics. Standardization is essential to both schemes, and no less to the continuous-production methods outlined here because, following the standardized product, come standardized materials, standardized operations, standardized production methods and even standardized limits.

Experiment Must Precede Production

"As indicated, changes will take place in the most highly standardized product, but, to make continuous production possible, such changes should only be made at regular intervals and after very considerable experimental work has been done. It is very difficult to forecast the effect of apparently trivial alterations, for in quantities minor matters may become crucial. In other words, the necessity for planning ahead is in proportion to the quantity to be produced. Keeping the car up-to-date without upsetting the continuity of "flow" is one of the greater problems for the engineers of a large-scale production concern, for, unless the product of the factory maintains a certain, and in this country a high quality, the "flow" of orders ceases and continuous production becomes impossible.

"In consequence, a great deal of research work and designing must be done which never is seen by the public, for it aims at improvement within very circumscribed limits; hence the design and research staffs have to learn thoroughly the most difficult of all lessons, that "Originality consists in thinking for oneself, not necessarily indifferently from other people." A free hand is not permissible in large production, for to exist at all it is essential that a large business must be based on sound economic principles.

What Standardization Means

"Standardization, as the word is commonly understood, and as used in the foregoing paragraphs to imply broadly that parts remain unchanged, is insufficient for continuous production. Standardization is only one necessary item among a number of others, which are perhaps better described as "regularization." Rough material, for instance, must not only conform to standardized specifications, both chemical and physical, and be within certain limits of size; it must be regular as regards its surface, condition and uniform in heat-treatment where this is called for. It must also be delivered to time so that there shall be no shortage or glut. Where more than one supplier is employed, it will be necessary to conform to limits of weight, and sometimes, particularly in the case of pistons and connecting rods, to the distribution of weight. This is all infinitely more essential on large than on small schedules.

"Again, in accuracy of work, it is, given the quantities, cheaper to make highly accurate work than otherwise. Operations which do not matter so far as the car functions are concerned, matter greatly when the work-piece has to pass through a series of jigged operations, more especially as sub-division of operations is one of the economizing devices of large production. The spare parts business also obtrudes largely, and it is found necessary to hold even loose fits within close tolerances, e. g., a fit may be 0.007 in. loose yet held to a tolerance of 0.001 in. Cumulative error is the bug-bear of the machine shop, and to avoid this, alone, calls for unusual accuracy, as one of the regularization devices in a large or continuous-production establishment.

"The author is aware that some "mass-produced" articles do not appear to bear out this contention on the matter of accuracy, but, on examination, it will be found that accuracy may be coupled with methods that are foreign to the British idea of what constitutes a 'good job.' Take the case of pressed steel parts against drop-forgings, or, for instance, a pressed underpan versus a cast aluminum sump; accuracy may be present in both cases, yet the solid job has an appeal to the engineer, which is wanting in the case of the lighter pressing, and it is this sense of a job well done which must guide us.

EDITORIAL

Trading and Traders

OUTTRADING the traders—that's what certain sharp business men are said to be doing in automotive circles. Here's the way they work it:

First, this sharp business man buys outright a used car from a used car dealer. Then he takes his used car to a new car salesroom and trades it in on a new car. The new car salesman, of course, allows him much more for his used car than he has paid for it. All that is left is for him to resell the new car at a cut rate, splitting his profit on the used car with his customer.

This practice hasn't been altogether uncommon among individual car buyers, but we hadn't heard about anybody making a regular business of it until the other day.

Such operators can be put out of business in just one way—by abstinence from overallowing on trade-ins on the part of the legitimate dealer. Where the legitimate dealer is doing business on an entirely sound economic basis, such practices aren't possible.

Mass Transportation

CAN the motor bus handle mass transportation? That's a question that has been propounded with much gravity during the last few years. The answer is "Yes," but everybody isn't convinced of that fact yet.

The latest figures published by the companies which control the motor bus and tube services in London afford new proof of the ability of the bus to handle great numbers of people. The London buses last year carried 1,158,411,377 passengers, an increase of 118,000,000 over the previous year.

The tubes carried 298,356,083, a decrease of 7,000,000 from 1923.

The number of passengers carried on the buses averaged just about three and one-half million a day.

Sounds like mass transportation, doesn't it?

Adult Males

"IN theory every person charged with authority should give his subordinates the maximum possible freedom, for it is conceded that men do not work their best when confined in strait-jackets." We quote from an article by Carl Dreher in the *American Mercury*. He continues:

"Some executives carry this theory into practice, usually with notable success. They lay out the work they want done, state their objectives succinctly, bid their subordinates go to it and abide the outcome. If the results are unsatisfactory and it appears that the fault is one of personnel, they fire the individuals responsible.

"Successful or unsuccessful, they treat their men as adult males."

Somebody, after reading this, is going to hark back to the Army Test results showing that a large number of men have the intelligence of only a 14-year-old child. To that criticism of the "adult male" method, it may be pointed out that the best way to get the respect and active cooperation of a 14-year-old boy is to treat him as though he already had reached man's estate.

Truck Prices

THERE is a real value in sound, publicly announced list prices for trucks. Such prices can be made meaningless by allowing too much on trade-ins, but at least they give the customer some basis upon which to estimate the value of what he is buying.

Nearly every industry that has prospered over a period of years has done business on a one-price basis. John Wanamaker stuck to the one-price policy when all of his competitors were indulging in cut-rate practices of various kinds. Today the Wanamaker stores are outstanding institutions and the bargainers and higglers still are doing business on the side streets of New York and Philadelphia.

The truck buyer is entitled to know how much a truck is worth. Confidence in the integrity and fairness of the truck industry must be built if commercial vehicles are to make the rapid progress justified by economic trends. Confidence can't be built so long as it is possible for a man to buy the same unit at different prices at several places in the same State. The full value of a standard list can't be realized, of course, until sound trade-in practices are established, but use of a stable list is a starting point for sound merchandising.

Looking Ahead

THE *Annalist* thinks that the peak of spring production nearly has been reached in many industries, but there isn't anything to indicate that any such point has been reached in the automobile business. The signs point to a continued upward trend in production for at least another month and perhaps for two months.

Business trends are a bit difficult to predict these days, with some factors looking quite favorable and others less pleasing. Conservative optimism still seems to be the rule in most parts of the business structure, however, and the automobile industry is in a good position at the present time.

Our Industry Today

Production Increases Bring Factory Schedules to 90 Per Cent Capacity—Dealers Urged to Place Orders

NEW YORK, March 30—The opening of the spring season in automobile sales finds production schedules at the factories running over 90 per cent of capacity. In a few plants night shifts have been put on to meet the demand from distributors and dealers, while in others output has not yet reached its peak.

Preliminary estimates of March production are to the effect that the total will be at least 20 per cent greater than in February. If a similar increase is shown in April, then the industry will be assured of a good year, though not a record-breaking one.

A survey of twenty-five key cities shows that fine weather in most sections has stimulated buying, and that sales are running slightly over the figures for the corresponding period a year ago. Despite the favorable outlook, dealers' stocks are abnormally low, and manufacturers, feeling that the pendulum has swung too far back from the overstocked condition that was faced last year, are urging larger orders in anticipation of the peak demand later on. Some of the distributors, it is known, are temporarily embarrassed by large stocks of cars that dealers have declined to take off their hands, but this situation is not regarded as serious and is already in process of being cleared up.

Tire manufacturers are having a very good season. There is considerable discussion of the price situation, and the consensus is that any changes will necessarily be upward, especially in view of the fact that crude rubber prices have gone over 40 cents a pound.

Truck production is steadily expanding, and the outlook is that 1925 will be as good a year as commercial car manufacturers have yet seen. There is even a strong possibility that the record of 1922 will be exceeded by a substantial margin. Sales of buses are beginning to assume major significance, and every day brings reports that new bus routes are being started.

The used car situation is slowly improving. Many dealers have become convinced that their prosperity depends to a great extent on a reasonable return from used car turnover, and some of the manufacturers have been urging a more conservative policy for some time past.

ISSUE BONDS ON FORD R. R.

WASHINGTON, April 2—The Detroit, Toledo and Ironton Railroad, owned by Henry Ford, was authorized by the Interstate Commerce Commission today to issue $1,181,000 of first mortgage 50 year gold bonds. The bonds will be sold at par, and the proceeds used for construction purposes.

Ford Co. Shows 1924 Gain of $100,435,416

Total Added to Surplus Equal to $581.74 a Share—$476 in 1923

BOSTON, April 1—The automobile industry's annual peep at the financial operations and conditions of the Ford Motor Co. is afforded by the filing of the balance sheet of the company as of Dec. 31, 1924, with the Massachusetts Commissioner of Corporations. The report shows that $100,435,416 was added to the profit and loss surplus of the company during the year, the total standing at $542,476,496, as compared with $442,041,081 at the end of 1923.

It does not appear whether any profits were withdrawn during the year in the form of dividends for the three owners—Henry Ford, Mrs. Ford and Edsel B. Ford. If it is assumed that no dividends were paid, then the indicated net profits for the year were equivalent to the surplus—$100,435,416, or $581.74 a share on the 172,645 shares outstanding, against $476 the preceding year.

It is impossible to determine how much cash the Ford company had on hand, as under the item of "cash" in the statement are included notes receivable, accounts receivable, securities, patent rights and trade marks. The total under this heading is $300,275,845, against $271,618,668 the previous year. Total assets stood at $644,624,468, against $568,101,639. The statements for the two years compare as follows:

Assets

	1924	1923
Real estate	$112,030,755	$93,100,049
Machinery and equipment	115,089,863	87,689,441
Inventory	95,254,936	94,328,306
Cash	300,275,845	271,618,668
Good-will	20,517,985	20,517,985
Deferred charges	1,455,082	847,187
Total	$644,624,468	$568,101,639

Liabilities

	1924	1923
Capital stock	$17,264,500	$17,264,500
Mortgages	145,000	145,000
Accounts payable	56,440,618	71,214,937
Reserves	28,307,883	.....
Reserves for Federal and local tax	.....	37,436,120
Profit and loss surplus	542,476,497	422,041,081
Total	$644,624,468	$568,101,639

Would Acquire New York-Chicago Air Mail Route

NEW YORK, April 1—Plans are under way whereby a group of New York and Detroit capitalists and aeroplane manufacturers would organize a company with a capitalization of from $2,000,000 to $3,000,000 to take over the operation of the New York-Chicago air mail service, it is learned here.

Preliminary steps were taken at a meeting in Detroit attended by William Stout of the Stout Metal Airplane Co., in which Henry Ford is said to be interested; R. E. M. Cowdie, president of the American Railway Express Co.; Samuel Rea, president of the Pennsylvania Railroad, and E. V. Rickenbacker, automobile manufacturer, as well as others.

Freight Rate Survey Followed by N. A. C. C.

NEW YORK, April 2—The Freight Traffic Division of the National Automobile Chamber of Commerce, at a meeting in Detroit conducted by J. S. Marvin, assistant general manager of the association, heard reports from special committees which have attended the Eastern Class Rate revision hearings before the Interstate Commerce Commission at Washington, and it was decided to appoint a special committee to consider the announcement made by the I. C. C. in connection with the Hoch-Smith resolution recently adopted by Congress.

This resolution calls for a general investigation of the entire freight rate structure of the country, and the commission has invited an expression of views from railroads and shipping interests.

"The Congressional resolution," said Mr. Marvin, "declares it to be the true policy in rate making to be pursued by the commission that the conditions prevailing in the several industries be considered so far as legally possible, apparently with the idea of having freight rates so adjusted that articles and commodities of the several kinds will not be restricted in their movement by freight rates. It is indicated that re-

(*Continued on page* 643)

Dodge Company Sold

Merger May Follow Purchase by Dillon, Read & Co., New York Bankers—Price Estimated at $150,000,000 *to* $175,000,000

NEW YORK, April 2—Dodge Bros., Inc., will shortly be acquired by Dillon, Read & Co., New York bankers, under the terms of a sale agreement that is virtually complete as AUTOMOTIVE INDUSTRIES goes to press. Although there is no consolidation of Dodge with other automobile companies as part of the purchase deal, it is regarded as likely that a huge merger will be effected in the near future. Graham Bros., it is understood, is not included in the purchase.

The terms of the sale call for the payment of between $100,000,000 and $125,000,000 in cash and about $50,000,000 in securities. The price was based on current Dodge earnings, estimated at $20,000,000 for 1925. Kuhn, Loeb & Co. are reported as interested in the Dodge transaction, which is the largest the industry has seen since the organization of General Motors. The latest official word is the following announcement from Dillon, Read & Co.:

"An agreement has been reached for the sale of Dodge Bros., Inc., to Dillon, Reed & Co., and contracts of purchase are now being drawn.

"Consolidation of Dodge with any other company or companies is not in contemplation by the purchaser and current rumors of consolidation are entirely without foundation. It is the intention that Dodge Bros., Inc., shall continue to be declared an independent corporation, without change of policy or personnel or management."

The cash feature of the Dillon, Read bid is reported to have been the determining factor in the sale. Negotiations have been under way for several months, or ever since word first got about that the widows of John F. and Horace E. Dodge were open to offers for their property. In the tense financial struggle that developed in the final days of the negotiations J. P. Morgan & Co., representing General Motors Corp., were in active competition with Dillon, Read & Co., for the Dodge property.

Despite diplomatic denials, there is reason to believe that the Dodge company will be the keystone around which a new automobile combination will be built, but which other interests will figure in this move, or when it will be brought about, is not indicated now. It is reasonable to assume that Dillon, Read & Co., as a banking firm, will not desire to continue long in active control of a huge automotive industrial property.

So far as the effect of the Dodge sale on the industry generally is concerned, it appears simply that the ownership of the company has changed hands, but that its general operating policy will be continued, presumably in the hands of the same factory organization. E. G. Wilmer, chairman of the board of directors of Goodyear Tire & Rubber Co., who has acted as a representative of Dillon, Read & Co., in the sale negotiations, is mentioned in Detroit as possibly slated to be chairman of the board of the Dodge company under the new regime.

The possibility of a second transaction in which the Dodge property would be bought from Dillon, Read & Co. by General Motors is also given credence in the automobile capital, this second sale to involve an exchange of stock and other collateral.

Negotiations for the Dodge owners were in the hands of John Ballantyne, treasurer of Dodge Bros., Inc., and a trustee with Mrs. Horace E. Dodge of the estate of her late husband. The Dillon, Read representatives, in addition to Mr. Wilmer, were A. C. Schwartz and S. W. Holland.

Control and ownership of Dodge Bros., Inc., was vested entirely in the trusteeships created eighteen months ago in the final administration of the estates by Howard E. Bloomer, who with the Dodge widows, was administrator. In the lifetime of the Dodge Bros., Mr. Bloomer had acted as legal advisor and general counsel through practically their entire business career in Detroit. On their death, he reorganized the company and became chairman of the board, acting in this capacity until about a year ago, when this office was abolished. Management of the company was in the hands of the directors who held voting shares of stock, but the actual ownership of all stock was held equally by two estates.

That the Dodge widows have consented to the sale of the company now, after resisting offers which have been made at intervals since the deaths of John and Horace Dodge, in 1920, is regarded as simply a yielding to the advice of financial advisors, who stressed the tremendous burden of responsibility which continuance of their holding entailed.

Since the deaths of John and Horace Dodge there has been continual speculation as to the action that would be taken by the estates in maintaining the Dodge company. Reports of purchases and combinations have been current throughout these three years, the name of Charles M. Schwab being mentioned persistently at one time as a purchaser,

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HUGE FEDERAL TAX INVOLVED IN SALE

DETROIT, April 2—The reported purchase price of between $150,000,000 and $175,000,000 for Dodge Bros., Inc., shows the enormous growth of the business, which was incorporated in 1914 at $5,000,000.

According to Fred L. Woodworth, collector of internal revenue here, the Federal Government will take no action in the Dodge sale until the filing of the 1925 corporation tax returns next January. A tax will then be collected from the Dodge heirs on the profit made through the sale of the company, he said. This will be based on the value of the plant at the time of incorporation, in relation to the sale value. A tax of 12½ per cent will be collected on the net profit of the sale.

Dodge History Reads Like Arabian Nights

NEW YORK, April 2—The foundation for the present strong position of the Dodge Brothers Motor Car Co., which has made it the most sought-for property in the automotive industry, was laid more than a generation ago by John and Horace E. Dodge.

It was in 1901 that the Dodge Brothers, after a varied experience in various mechanical lines, began their careers as automobile builders, their first contract being for 3000 sets of transmissions for the original Olds runabout. When Henry Ford organized the Ford Motor Co. in 1902 he persuaded the Dodges to engage in the manufacture of engines, transmissions and steering gear. While perfecting his engine Ford frequently ran into difficulties, and he often sought the advice of the brothers, who are credited with much of the success of the Ford engine.

The Dodges, when they established relations with the Ford company, took a minority stock interest, amounting to about 10 per cent. Disagreement with Ford arose in 1907 and continued for several years. The Dodges' plant was almost exclusively operating on Ford products, and the brothers sought, without success, to have Ford absorb the plant. There was also a controversy

(*Continued on page* 638)

White Motor Earns $4,084,248 in 1924

Income Equals $8.17 Per Share on Capital Stock—Cash Position Strong

NEW YORK, April 1—The White Motor Co. and subsidiaries report for the year ended Dec. 31, 1924, net income of $4,084,248, after charges, equal to $8.17 a share on the 500,000 shares of capital stock outstanding, against $6,964,665, or $13.93 a share in 1923. Gross sales amounted to $46,574,737, as compared with $48,876,606 for 1923.

Deducting $2,000,000 paid in dividends, a balance of $2,084,248 was carried to surplus, making the total of this account at the end of 1924 $11,534,157, against $9,425,739 the previous year. The cash position of the company continues to be strong. Cash, notes and accounts receivable amounted on Dec. 31, 1924, to $13,975,345, and notes and accounts payable to $5,372,849, making the ratio of current assets to current liabilities five to one.

The value of the company's finished trucks, finished parts, materials in process, raw materials and supplies was placed at $14,547,102 at the end of 1924, as compared with $14,668,034 at the corresponding time in 1923. In his report to stockholders, President W. C. White says:

> The note of economy sounded by the administration at Washington, may well be heeded by American business. With the rehabilitation of Europe, these countries again will become a factor in American markets and will add their products to the domestic production. This will call for a program of strict economies and lowering of production costs among American manufacturers. Year by year the economies of the motor truck and motor bus are contributing their share toward this end, and now more than ever it is necessary that producer and operator realize the fullest benefit from the installation of efficient truck and bus units.

In conclusion the report calls attention to the apparent upward trend of business; that the company is looking forward to a satisfactory year, and that its factory and organization as a whole are in the best condition in its history to take every advantage of improved conditions.

JACKSON SALE DELAYED

JACKSON, MICH., March 31—The sale of the Jackson plant of the National Motors Corp. has been postponed for three weeks by the Federal Government in the absence of bidders. The sale is being conducted by the government to satisfy its claims for back taxes and interest. The plant formerly was the property of the Jackson Automobile Co. and came under the ownership of the National company when it was organized. It has never been operated by its present owner and has been idle for three years.

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

New York, April 1—The outstanding feature of last week's business developments was the pronounced weakness in the principal speculative markets, without any fundamental change in the general business situation or outlook. Both stock and grain prices declined rather sharply, and commodity prices in general tended downward. Trade and industry continued moderately active, with conservatism still the dominant note.

Car loadings in the week ended March 14 were slightly less than in the preceding week, but exceeded the corresponding figures for any previous year. The total was 924,149, comparing with 930,009 a week before and 916,762 a year earlier. Freight traffic in January was the largest ever handled at that season, with the exception of the total for January, 1923, which was 1.8 per cent greater.

Production of crude petroleum in the week ended March 21 averaged 1,944,700 barrels a day, as against 1,949,200 barrels in the preceding week and 1,906,850 in the corresponding period last year. The decline was due principally to reduced output in Oklahoma.

An analysis of foreign trade figures for February shows that, as compared with a year ago, exports of raw foodstuffs and raw materials increased, while those of manufactured goods declined. Imports of raw foodstuffs, raw materials and manufactures were larger, while those of manufactured foodstuffs and partly manufactured goods were smaller. Trade with Europe was considerably larger than a year ago, but trade with Asia and other North American countries was materially reduced.

The total domestic output of pig iron in 1924 amounted to 31,405,790 tons, or 22 per cent less than the record figure of the preceding year. Last year's output, however, exceeded that of any other peace year except 1920.

Business failures in the week ended March 26, according to Bradstreet's, numbered 397, comparing with 390 in the preceding week and 431 in the corresponding period last year.

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended March 25 were 10.2 per cent less than the total for the preceding week, but 13.2 per cent more than that of a year earlier.

Fisher's index of wholesale commodity prices stood at 160.6 last week, as against 162.2 a week earlier and 163.4 two weeks earlier. Last week's figure is the lowest since the week of January 10.

Willys-Overland Co. 1924 Net $2,086,645

Earnings Compare with $13,034,032 in 1923—Equal $9.46 a Preferred Share

TOLEDO, April 1—Willys-Overland Co. for 1924 reports net profit of $2,086,645 from operations, equal to $9.46 a share earned on the outstanding $22,049,500 preferred stock, on which accumulated dividends amount to 29¾ per cent. This compares with a net profit of $13,034,032 or $59.11 a share on the preferred in 1923.

Added to the net profit for 1924 was $748,725 received from settlements and securities sold and $135,000 from adjustments of reserves, so that $2,970,371 was added to surplus account. The profit and loss surplus at the end of the year was $15,972,789. The consolidated balance sheet of the parent and subsidiary companies shows a strong position, with current assets listed at $33,264,818 and current liabilities at $3,774,974.

President John N. Willys in his statement to stockholders says:

> Our inventories have been carefully taken. The amount is $22,767,040, which is $10,632,814 less than the previous year. This substantial reduction shows the effect of better operations and closer turnovers. While substantial progress was made during the last year in the establishing of better relations with our dealer organizations and in the development of new models, automobile prices and buying showed a heavy decline affecting our operations in common with others in the industry. Much of this downward effect was offset by refinements in processing and controls upon expenses to keep them as low as possible.
>
> Our new models for the coming year have been well developed and have met with splendid reception. As much of our expenditures for engineering development of these new models as seems proper has been carried forward to be absorbed concurrently with the sale of these cars. Our surplus account shows an increase of $2,970,371, and our balance sheet shows a sound position from the standpoint of working capital, with a very conservative investment in plant facilities.

FOOTE-BURT BUYS SIPP

CLEVELAND, April 1—The Foote-Burt Co. of this city, which has been engaged in the manufacture of drilling machines for thirty-three years, has taken over the business of the Sipp Machine Co. of Paterson, N. J., manufacturers of sensitive drills. This gives the Foote-Burt company a very extensive line of drilling machines. The Sipp line of sensitive drills comprises three sizes and each size can be furnished with either a single spindle or multiple spindles. Among the features of these drills are the absence of the quarter-turn belt and the possibility of changing speeds rapidly. They are ball-bearing throughout and the heavier type can be furnished with power feed to the spindle.

Ford Launches Used Car Policy

New Procedure Requires Reconditioning, Resale at Profit and Guarantee by Dealers With 30 Days' Free Service

DETROIT, March 30—Ford Motor Co. launched this week a national used car sales policy designed for the two-fold effect of stabilizing Ford used car values strictly on a basis of unusued transportation, and to bring Ford used car business to the authorized Ford dealers. Under the plan cars bear a seal guaranteeing them to be in good condition, and dealers are required to see that they give service as represented in the sale.

In some respects the plan resembles the used car plan initiated by the Ford Motor Co. of Canada, Ltd., in 1924, the principal departure being in the appraisal method. Under the Canadian plan values were set according to a general average of allowances throughout the Dominion. Under the plan now launched here values are fixed strictly according to the condition of the car and its capacity for further use.

To assist dealers in making this true valuation, the Ford company is preparing a guide which shows how car values are affected by the condition of the parts of the car generally. Every detail of the construction is covered in this guide, and dealers are required to fill these in on an appraisal sheet and consider every feature in making allowances.

The car then has to be reconditioned to the point that it will yield satisfactorily the unused transportation. This unused transportation is the sole determining factor of the value, and dealers in selling it must do so at a profit. This means that cost of reconditioning and entitled profit must be taken into consideration in making the appraisal, so that the re-sale price will conform strictly to further transportation value.

Under the guarantee plan, the prospective buyer is informed that he may use the car for one week, and if it is not satisfactory, he may return it to the dealer and get full allowance on another used car or on a new car. The car is guaranteed to be in good mechanical condition, and the dealer is obligated to give free service on it for thirty days. The guarantee is voided if the owner has any repairs made on the car by anyone other than the dealer selling it during this period.

Features Advertised

In initiating the policy, the Ford company, through advertising, posters in dealer windows and other forms of publicity, is showing to the prospective owner the advisability of buying his contemplated used Ford from the authorized dealer. The conditions the dealer is obliged to meet are fully indicated, so that he may feel full confidence that the car he buys will give him the service that the dealer represents.

By setting up the thirty day guarantee as to mechanical condition, the Ford company insures that the dealer appraisal will be genuine and complete, as any expense of service during this period must be borne by the dealer. It is not required that the dealer tear down any inclosed parts to ascertain their condition, as the company feels that an experienced appraiser can determine the conditions of such units by operating the car.

SALIENT FEATURES OF FORD USED CAR PLAN

1—Values fixed on a basis of unused transportation.

2—Complete guide for appraisal and reconditioning.

3—Week's trial and month's guarantee.

4—Guarantee seal supplied.

5—Close factory check on appraisals of all dealers.

6—Insistence on part of factory that dealers MUST make used cars yield profit.

The plan will have the effect of setting up a more uniform system of appraisal through the Ford dealer organization, and consequently a more uniform pricing, obviating the possibility of owners gaining through "shopping" to the detriment of dealers generally. That dealers have suffered through loose appraisal methods is indicated by the company in making the plan known, and it is determined to control this situation.

All appraisals as made by dealers will come to the attention of the Ford company, and where these have not been made on a basis conforming strictly to the remaining transportation value, the dealer will have the facts called to his attention. The company is determined to correct and control the used car situation among its dealers to the point that this department will be required to show a profit consistent with the profits in the new car departments.

Cars which have only limited further value for transportation will not be reconditioned, but will either be scrapped by the dealer or sold as is, "with the customer fully informed of what he is getting." Dealers are free to salvage such parts of the cars they scrap that may be of resale value as used parts, this conforming to the general policy of the company on scrapped cars now effective.

Losses among the dealer organization in their used car departments in 1924 is responsible mainly for the institution of this policy. It is pointed out to dealers that much money has been lost by some through exorbitant allowances, while other dealers made profits on their used car departments through sound appraisal methods. The question as to which class they are in and as to whether they have been fair to themselves and other neighboring Ford dealers is left to their own balance sheets to disclose.

Institution of the used car policy guaranteeing good mechanical condition will also have the effect of making better credit facilities available for used car sales the company anticipates. Because of the risk surrounding such transactions without guarantee provisions, finance companies in the past have been disinclined to take up this paper, making it necessary in many cases for the dealer to require full cash payment or carry the notes himself.

Time Sales Probable

With the car guaranteed to be in a definite mechanical condition, it is expected that finance companies will accept used car time sales as they have new cars. Several important companies have already been found by the Ford company willing to finance time sales of trustworthy used cars, and it is expected that this acceptance will become general as this new policy becomes nationally effective.

As a further means of lessening the used car strain upon dealers, the Ford company is emphasizing the necessity of developing the non-owner field. Through a survey conducted by the company of the classification of prospects, it was found that the large percentage of these were present car owners. To overcome this condition, which the company points out means more trade-ins, dealers are advised to concentrate their sales efforts in the non-owner field.

The possibilities of good business non-owners is instanced by the fact that one dealer in a large city in 1924 sold more than 1000 cars to non-owners out of a total sale of 1400. This was possible, the company points out, because the dealer made a thorough canvass of his immediate trade territory and that out of 11,000 calls he has listed over 7000 non-car owners who are developing into live prospects at the rate of 25 a day.

In urging the necessity for seeking non-owners' business, the company points out that dealers must not reverse the situation and neglect Ford owners. This repeat business is wanted, it declares, but it wants it to be obtained at a profit.

In a statement to the public by Edsel

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N. A. D. A. Forms First State Council in Ohio

New Branch Will Replace Present Ohio Organization—Other States May Follow

NEW YORK, April 2—The Ohio councils of the National Automobile Dealers Association, which is expected to replace the Ohio Automotive Trade Association, is to be organized at a meeting in Columbus April 7. The plan of organization is unique and will be watched with considerable interest by dealers in all sections of the country.

The plan as outlined at a recent conference attended by prominent Ohio dealers and association heads and officers of the N. A. D. A. provides for the organization of N. A. D. A. members in each city into chapters which will elect chairmen who will, in turn, make up the State council. Dealers in Cincinnati, Cleveland, Youngstown, Toledo, Akron and other cities have already indorsed the plan, and a membership campaign will be launched shortly after the April 7 meeting to bring in chapters in the cities throughout the State.

With the formation of the Ohio council, the National Automobile Dealers Association will establish a branch office in Columbus, in charge of an assistant general manager.

The Ohio development is the first attempt to effect State organizations as units of the N. A. D. A. since the launching of the "One of a Thousand" campaign several years ago. Previous to that the work of organizing State associations had been slow and generally ineffective. By using the N. A. D. A. membership as the nucleus and building city chapters and State councils of them, it is believed that an organization of exceptional unity and coherence will be assured.

In going into Ohio with the present plan the National Automobile Dealers Association made it clear from the outset that it was not the desire or purpose of the national organization to disrupt any State organizations now in existence.

McFARLAN PRICE CHANGES

CONNERSVILLE, IND., April 1—McFarlan Motor Corp. announces that prices of all open models in the Single-Valve Series have been advanced $50 and that the five and seven-passenger sedans on this chassis have been advanced $80. The five other closed models in this series have been subjected to reductions varying from $20 to $270. Four new types are announced for this season: a coupe, brougham and two special sedans.

The list prices of the Twin-Valve Series remains unchanged. A seven-passenger sedan at $6,810 and a seven-passenger enclosed drive sedan at $7,110 have been added.

1600 *AUTOMOBILE BILLS INTRODUCED IN* 1925

WASHINGTON, March 30—In the first two months of 1925 over 1600 bills relating to the automotive industry were introduced in the various State legislatures, it is reported by the Bus Division of the American Automobile Association. Many are very drastic and if enacted would restrict the use of motor vehicles. Some are constructive and should be passed, the Bus Division says, but the majority were drawn up without proper investigation for the need of such laws. More attention to the enforcement of existing laws is urged.

French Authority on Springs Talks Here

NEW YORK, March 31—Dr. Pierre Lemaire, world authority in automobile design, and named by the French Ministry of Education as exchange professor to the United States in engineering and applied science, has arrived in this country to begin his lectures at seven universities.

The opening lectures are being delivered at Columbia University. He will continue his work at the University of Pennsylvania, Johns Hopkins, Cornell, Harvard, Massachusetts Institute of Technology and Yale.

Professor Lemaire, who resigned from the French Navy in 1920 to enter the industries, has since built up and directed a laboratory of scientific research at Lyons for Rochet-Schneider, manufacturers of automobiles. In his American lectures Professor Lemaire will deal with "Spring Suspension of Vehicles." He will publicly describe the experiments that have led to his mathematical definition of the comfort factors in designing cars or comparing spring suspensions.

Parts Makers to Hear Mattix on Export Aid

WASHINGTON, April 2—P. R. Mattix, chief of the parts and accessories section of the automotive division, United States Department of Commerce, will make a tour of the leading parts and accessories manufacturing cities and discuss with manufacturers their export problems, with the view of the department giving exporters the desired assistance in their export business.

Mr. Mattix's itinerary will include Indianapolis, April 3-4, where he will confer with manufacturers and be the principal speaker before the Board of Commerce, Foreign Trade Division; South Bend, April 6; Chicago, April 7; Detroit, April 8-9; Toledo, April 10, and Cleveland, April 11-12.

Hall Lamp Considers Brown Mfg. Purchase

Two Established Concerns May Merge After Stockholders' Meeting

DETROIT, March 30—Stockholders of the C. M. Hall Lamp Co. will meet April 4 to ratify the proposal of the company to purchase outright the assets of the John W. Brown Manufacturing Co. of Columbus, Ohio, by taking the stock of the Brown company in exchange for Hall stock. Under the plans of the purchase, the Hall company would continue the operation of the Brown plant in conjunction with its plants in Detroit and Racine. There would be no change in the general merchandising policies as result of the purchase.

Both companies are widely known in the industry and hold an outstanding position as lamp manufacturers. The Brown company was organized in 1888 to manufacture carriage lamps, graduating into the automotive field. The Hall company was formed in 1909 to manufacture automobile lamps. Under the plans for combined operation, the Brown plant probably would be devoted to quantity production and the Hall plants to higher grade products.

Total current assets of $1,638,756.18 are shown in a consolidated balance sheet prepared from the balance sheets of the two companies as of Dec. 31, 1924. This includes $428,495.29 in bonds and $48,793.90 in cash. Total current liabilities are $254,645.61. Fixed assets after depreciation total $1,439,792.88. Total assets of the consolidated companies are $3,386,043.09.

The Hall stock has been listed on the Detroit Stock Exchange and has a good dividend record. The Brown stock has been held within the company until recently when a public offering was made.

Dodge History

(*Continued from page* 635)

about the disbursing of Ford dividends. In 1910 the Dodges decided to enter automobile production on their own account, and their first car was turned out in 1914. In 1920 Ford purchased their interests in his company for $27,000,000. In that year both John and Horace E. Dodge died.

Dodge Brothers product rapidly took a leading place in the automobile field and from eighth place in point of production in 1915 the plant rose to fourth place in 1917, and today its business is second only to Ford's. Last year the gross sales of Dodge Brothers were $191,000,000, and shipments to dealers aggregated 193,861 passenger cars and 31,243 commercial vehicles. More than 1,000,000 of the 1,250,000 cars built and sold are still in service.

Germany Alarmed at Ford Invasion

With Lifting of Import Embargo, Small American Cars May Capture Market

WASHINGTON, April 2—The German automobile industry, now that there is every prospect of a lifting of the import embargo, is thoroughly aroused over the impending invasion of its territory by Henry Ford, with his extensive and technically superior plants, and by the efficient French and the growing Italian automobile industries, it is confided here in a comprehensive survey of the problems of the German automotive industry contained in an issue of the *Labor Review*, just made public by the United States Department of Labor.

"To meet the prospective foreign competition," says the review, "the German plants will have to organize closely. The combine of the two leading works, Daimler and Benz, can, therefore, be looked upon as the beginning of extensive concentration. As in other industries, a strong and close dealers' organization has been formed in the German automobile industry, which is greatly interested in the import of automobiles, and this may make difficult the situation of German automobile plants which have no sales organizations of their own. The future will show to what extent the independent interests will come to an agreement among themselves."

Attempt Remodeling

It is explained that with the lifting of the import embargo, Germany will be caught unawares as with the period of deflation, the import embargo, the heavy domestic demand, and the lack of serious foreign competition, the automotive industry there has been able to survive technically less efficient and financially weak. Foreign competition entering the market with modern, better and cheaper products cannot help but drive out of existence the backward German enterprises, in so far as this is not being effected by the prevailing credit stringency. The leading German automobile factories, it is reported, are fully aware of this danger, and since they cannot prevent the lifting of the import embargo, they are attempting, much too late, to remodel their plants, but this remodeling is very difficult because of the credit stringency, the survey states.

"In the future," continues the survey, "the small low-powered car (Kleinauto) is sure to become popular in Germany, and the number of automobile owners who drive their own cars will increase considerably. The German automobile industry must concentrate more upon the manufacture of light low-power cars destined for general use than upon extentive high-power cars. In view of the high cost of gasoline and oil in Germany, economic operation will be one of the chief requirements.

"The German automobile industry seems to be particularly alarmed over the prospective invasion by the Ford Motor Co. It is stated that, while the German market has been closed to the Ford company by the existing import embargo, the company has, in anticipation of the lifting of the embargo, unloaded in the free port of Hamburg several shiploads of automobile parts and concluded a contract with a large German ironworks for the manufacture and sale of its motor vehicles."

In contrast to the automobile industry in Germany, it is said that the accessories factories are greatly interested in the removal or lowering of the customs barriers. The products of this industry are popular abroad, and if Germany adopts a reasonable tariff policy, a revival of this industry may be expected.

A. A. A. SECRETARIES PLAN FIRST MEETING

WASHINGTON, April 2—A total of from 350 to 400 secretaries from all over the United States have signified their intention of attending the convention of American Automobile Association club secretaries to be held here April 30 to May 1. This will be the first secretaries' conference since the amalgamation of the National Motorists' Association with the American Automobile Association.

One of the outstanding features on the agenda of the convention is the formulation of a touring program for 1925. In view of the tremendous increase of long-distance touring and the fact that Three A. secretaries route 2,000,000 tourists a year, this feature is regarded as one of the most vital from the viewpoint of automobile owners and also from the standpoint of the service of the national organization. Another important subject that will be taken up is the question of street and highway safety.

TRAINS SUFFER FROM BUSES

ST. LOUIS, March 31—In a recent address before the Junior Chamber of Commerce L. W. Baldwin, president of the Missouri Pacific Rairoad, declared that competition by automobiles and buses made possible by hard road systems had cost the Missouri Pacific $1,400,000 in passenger revenue during 1924.

"Construction of hard roads has made possible an ever increasing auto traffic," said Baldwin. "Commuters who formerly took the trains to and from town now drive their own ars or make the trip in buses specially operating for such traffic. The Missouri Pacific is able to trace a loss of $1,400,000 for last year directly to this cause."

Three Models Added to Studebaker Line

Special Six Coupe and Coach, Big Six Brougham Scheduled for April

SOUTH BEND, March 30—A five-passenger, four-door brougham on the Big Six chassis and a coach and a four-passenger country club coupe on the Special Six chassis will be placed in production early in April by the Studebaker Corp. of America. The new Big Six model lists at $2,575, while each of the new Special Six body models is priced at $1,695.

The Big Six brougham is finished in lacquer, royal Studebaker blue below the belt and black above. The belt molding is black with ivory striping. Upholstery is in a taupe shade with blue striping with which the head linings match. Equipment on this model includes front and rear bumpers, landau irons on the rear quarters, steel trunk, snubbers, motometer with winged cap, combination stop and tail light, extra tire, tube and cover protected by lock, automatic windshield cleaner, rear view mirror, ventilating one-piece windshield and sun visor. Door panels and garnish rails are finished in walnut, and the interior hardware is in butler silver.

Coupe Accommodates Five

The Special Six coach is finished in Wyandotte green lacquer below the belt and in black above. The rear quarter panels are steel. Upholstery is brown Velmo with headlining in harmony. Doors are sufficiently wide to give access to the rear seat without causing the occupant of the folding seat to leave the car. The windshield is a one-piece design with automatic cleaner. Rear view mirror and sun visor are furnished as standard equipment.

Although the Special Six country club coupe is rated as a four-passenger model, it will accommodate five through the use of a rumble seat. It is equipped with motometer and winged cap, combination stop and tail light mounted on a steel apron protecting the gas tank at the rear, automatic windshield cleaner, rear view mirror, and package compartment in back of seat with space on top for golf bags. The rumble seat is finished in black leather. Interior upholstery is mohair, the color being walnut to match the walnut-finished panels and garnish moldings. The rear quarters have vertical oval windows and are fitted with landau irons.

NEW FABRIC PLANT FOR GEORGIA

ATLANTA, April 1—One of the largest plants in the South engaged in the manufacture of automobile tire fabric is to be established this year at Rome, Ga., by the Brighton Mills Co. of Passaic, N. J., according to an announcement by officials of that company.

Survey Shows Production and Sales Gaining Speed

(*Continued from page* 609)

St. Louis

Due to the impetus supplied by the automobile show held here early in March and to favorable weather conditions, retail sales of automobiles have been very satisfactory during the month. Cars in the higher price ranges have been good sellers here lately. Those cars in the price range from $1,000 to $2,500 have been fair to good. It is said by dealers in cars of these classes that they could make many more sales if they were content to pay exorbitant prices for used cars in trade. This they will not do, and it is expected that it will only be a short time until the prospective customers decide to take a reasonable amount for their old cars. Dealers, due to their attitude with regard to used cars, are not overstocked on them.

Birmingham

March business showed an increase over the business during the first two months of the year in this section, and automobile dealers express optimism over the outlook for the spring season. Weather conditions were excellent, and while sales were not as heavy as the automobile men had hoped they would be, they are improved somewhat. Local dealers predict that business in April will be very good in Birmingham and the State at large.

Used cars are moving some, though not so satisfactorily as they should be, according to the dealers, who are trying to work out some plan for increasing the sale of used cars.

The credit situation is very satisfactory, according to Birmingham dealers. Time payments, as a whole, have been good, especially on the more expensive cars, and dealers in the cheaper cars report that there have not been very many returned cars. Dealers in the low priced cars are more optimistic in their reports than are the dealers in the higher priced makes.

Pittsburgh

Trade during the past month has been rather slow in developing, but the last half, with considerably better weather, showed a marked picking up in sales. There was a large replacement business during March, and the same is likely to occur during April, but dealers are sanguine that complete sales of new cars without trades will run at least double those of March.

There is scarcely a dealer in the Pittsburgh district who is carrying any stock of cars, and all customers are compelled to wait for delivery. New models in lower priced cars have apparently met with approval, for buying in this line has shown a marked improvement. Medium priced cars are finding only a fair sale thus far, while active interest in this section is displayed in eight-cylinder models.

Milwaukee

Despite generally favorable weather conditions, sales of new automobiles in the Milwaukee territory have not been as good to date this year as they were during the corresponding period of 1924. Sales of used cars, on the other hand, were better than for the like period of any past year, and dealers' investments in the same, in general, are consequently lower.

Over 90 per cent of all cars sold pass to the purchaser under an installment payment plan contract. Payments on such contracts already out are said to be coming in better than during the last two months of 1924. Predictions, in general, are that the volume of new car sales for the year will be normally good, but in no respect will it be spectacular.

Minneapolis

Weather conditions generally in the Minneapolis district have been favorable in March to automobile sales and drive-away deliveries. Business generally is better than last year in March, the used car trade is better than a year ago, and sales and credit conditions are improving. An unusual condition is that dealers have not enough used cars to supply calls. Occasionally a dealer is found who is stocked up, but at factory branches the report is pretty generally unanimous there has never been such a low stock of reconditioned automobiles. Repossessions and defaults in time payment contracts are rare in the Ninth Federal Reserve District. It is estimated that 90 per cent of automobiles are being bought on time, but payments are steady.

New Orleans

March has been a better month with the automobile dealers in this section of the South than was February, which month in turn was better than January. The weather throughout March was almost ideal for spring. This helped to stimulate sales of new cars.

The used car situation continues to be a mixed problem, different dealers giving diverse reports. Dealers do not appear to be overstocked, although sales of used cars have been noted in several cities in this territory. It seems that the energetic dealers are getting rid of their used cars satisfactorily, but that such cars are not moving well with the dealer who makes little effort to attract the public to them.

Indianapolis

Indiana automotive business for March will show a large gain over February sales in new cars, but it is not expected to reach the abnormal large figure of last year when March broke all previous records. The weather in the fore part of the month was not conducive to extremely active retail business, but the latter part of the month has been above the average. Some lines with especially attractive prices for quality models have beaten all previous records, and some of the leaders in the moderate price field have also established new marks, but on the whole, industrial centers of the State are lagging somewhat with rural sections going ahead.

Those who have pushed used cars have kept ahead of the game, and some report these vehicles moving better than the new cars. Finance companies report time payments better than a year ago. There are dealers with large stocks of used cars, but generally this section of the business is on a better level than it was last year, and trading is being done on a sane basis, with a few outstanding exceptions.

Hartford

Business during March in the local and surrounding territory has been quite satisfactory. The old line successful houses drew down a good share of sales and even the lesser known contrived to register better in some instances than had been anticipated. Used cars have caused much apprehension, and a few dealers have far more than a comfortable quota. Reduction of used car inventory in the past few weeks has been slow in some quarters.

There is a tendency toward closer credits. The tendency is to go easier on paper and trade-ins. In several instances dealers have passd up sales rather than make a preposterous allowance. Several dealers report the slow paying of parts and repair accounts by customers.

San Francisco

Though automobile sales in central and northern California—the territory tributary to San Francisco—for March, 1925, were from 27 to 30 per cent below those of March, 1924, and still further under those of March, 1923, there are some prospects that April sales will exceed those of the month just closed and possibly approach those of April of last year. Immediately following the Pacific Automobile Show, held here in February, there was a slight sales increase which extended through the first week in March; following the 15th of March there was another brief improvement in sales conditions, due to the rapid improvement of the country in general because of heavy rains at the end of February. Lack of more rain and a lowering of the psychological influence of the big merchandising show, however, allowed March sales to slump again.

Toledo Lays Plans for Large Airport

Automotive Men Would Spend $500,000 on Field as New York-Chicago Link

TOLEDO, March 30—Leading automotive manufacturers of Toledo under the leadership of Robert A. Stranahan, president of the Champion Spark Plug Co., have taken the initiative in securing for Toledo an airport following the announcement here today of the formation of a new $3,000,000 corporation for development of a commercial flying service between New York and Chicago.

Capt. Eddie Rickenbacker sat in on a conference with Chamber of Commerce, city and business representatives, and urged the purchase of a mile square field for a port. "Toledo is a key city for connecting the Michigan cities with this new air development and should lose no time in getting into the picture," he said.

"Few realize the importance of this air development and the rapidity with which it is coming. I believe that in 25 years the air industry will surpass the automobile industry of today. The social radius will be enlarged to 100 miles. The network of commercial services will make the country smaller in distance and time than is Texas today."

C. O. Miniger proposed the plan of underwriting the purchase of a field for $500,000 or more and later disposing of it to the city if desirable. H. C. Tillotson, Sydney Vinnedge, president of the Chamber of Commerce; I. G. Macomber, traffic commissioner; Myron Downs, city plan engineer, and other business men concurred in the plan. Steps will be taken immediately to start this development so that aircraft manufacture may be a corollary to the transport terminals.

Nash Adds Four-Door Six Sedan at $1,545

KENOSHA, WIS., March 30—Nash has added a four-door sedan priced at $1,545 to its Special Six line. It is upholstered in dark blue mohair velvet, and arm rests are provided for the rear seat. The hardware is silver finished. Equipment includes dome light, vanity case, smoking set, heater, silk window curtains, windshield wiper and rear vision mirror.

CLEVELAND INCREASES OUTPUT

CLEVELAND, April 1—March sales have produced a banner month for the Cleveland Automobile Co., according to an announcement made today by Sid Black, vice-president. Production at the plant has been increased 300 per cent in March over February, and this was done to meet orders. February sales this year were 25 per cent greater than they were in the same month of 1924.

Exports, Imports and Reimports of the Automotive Industry for February of Current Year and Total for Eight Months Ending February, 1925

EXPORTS

	Month of February 1924		Month of February 1925		Eight Months Ending February 1924		Eight Months Ending February 1925	
	Number	Value	Number	Value	Number	Value	Number	Value
Automobiles, including chassis	.....	.....	.....	.....	.....	.....	.....	.....
Electric trucks and passenger cars	4	$ 9,456	4	$ 10,620	124	$ 164,992	99	$ 131,002
Motor trucks and buses except electric:								
Up to 1 ton	1,155	533,799	.....	.....	13,808	5,681,148	9,483	3,847,905
Over 1 and up to 2½ tons	357	509,362	418	573,386	2,999	3,867,278	3,557	4,807,201
Over 2½ tons	194	463,876	94	246,880	1,022	2,591,093	980	2,533,827
Total motor trucks and buses except electric	1,706	1,507,027	2,152	1,561,573	17,829	12,139,519	17,915	12,810,006
PASSENGER CARS								
Passenger cars, except electric:								
Value up to $500 inclusive	5,042	1,845,531	5,319	2,028,561	34,266	12,418,749	38,970	14,338,233
Value up to $800	3,792	2,525,610	4,194	3,016,877	22,552	14,899,125	26,264	18,573,251
Value over $800 and up to $2,000	4,234	4,445,516	.....	.....	29,293	31,336,518	22,761	26,749,809
Value over $2,000	262	710,764	325	899,032	1,928	5,411,560	2,338	6,571,645
Total passenger cars, except electric	13,330	9,527,421	14,739	11,653,478	88,039	64,065,952	100,318	77,962,486
PARTS, ETC.								
Parts, except engines and tires:								
Automobile unit assemblies (Lbs.)	28,363,330	4,521,231	11,357,926	2,010,806	181,522,198	37,434,405	114,594,148	20,312,866
Accessories and parts (Lbs.)	2,133,102	619,765	1,041,861	483,900	3,744,581	1,245,331	9,963,397	4,229,314
Automobile service appliances (not elsewhere specified) (Lbs.)	252,754	98,362	467,530	242,023	2,111,553	1,001,272	5,078,617	2,192,941
Station and warehouse motor trucks (No.)	5	4,051	5	2,650	149	91,754	97	50,282
Trailers	20	5,664	33	20,500	342	107,209	427	153,001
Airplanes	13	51,000	2	2,000	51	295,321	20	150,661
Parts of airplanes, except engines and tires (Lbs.)	16,172	5,517	2,754	28,819	209,433	49,961	69,286	80,760
INTERNAL COMBUSTION ENGINES								
Stationary and Portable:								
Diesel and Semi-Diesel	148	12,777	64	31,586	599	183,953	705	290,047
Other Stationary and Portable:								
Not over 10 H.P.	1,485	126,011	1,633	158,499	17,115	14,548,849	18,690	1,823,945
Over 10 H.P.	229	103,611	105	119,657	2,064	1,147,608	1,355	1,113,534
Motor trucks and buses	494	39,473	4,910	461,903	964	97,305	15,660	1,347,971
Passenger cars	3,554	521,131	4,492	476,904	18,124	2,704,833	22,922	2,817,674
Tractors	10	4,999	6	718	1,513	385,959	2,050	637,575
Aircraft	23	46,100	1	100	90	114,331	40	61,030
Accessories (Lbs.)	805,958	327,293	452,828	219,749	5,236,174	2,234,335	4,448,166	2,039,175
BICYCLES, ETC.								
Bicycles and tricycles (Number)	310	7,232	704	19,239	15,752	158,717	4,983	124,927
Motorcycles (Number)	2,010	504,973	1,960	451,963	13,843	3,465,704	11,162	2,552,331
Parts, except tires (Lbs.)	323,015	153,714	210,799	105,128	2,228,112	1,167,378	1,706,597	975,394
IMPORTS								
Automobiles and chassis (dutiable)	25	35,396	44	122,296	610	540,250	360	534,317
Other vehicles and parts for them (dutiable)	.....	128,479	.....	62,369	.....	1,055,548	.....	441,759
REIMPORTS								
Automobiles (free from duty)	20	19,761	42	65,082	300	464,718	430	636,428

Stewart Announces New Two-Ton Unit

Model 18 Priced at $1,890—Bus Chassis Soon to Be in Production

BUFFALO, March 31—A new two-ton capacity unit, designated as model 18 and priced at $1,890, has been added to the line of trucks manufactured by the Stewart Motors Corp. It is also announced that a six-cylinder bus chassis will shortly be placed in production.

The bus chassis will be built in 198 and 220 in. wheelbase lengths, which will list at $3,950 and $4,150, respectively.

The two-ton truck has a four-cylinder 4 x 5 in. engine, with five bearing crankshaft, full pressure lubrication and pump circulation of cooling water. The carbureter is a Zenith and the starting, lighting and ignition system is of Remy make. The radiator has a tubular type core and cast tanks. Multiple dry disk clutch and three speed transmission are assembled with the engine in a unit power plant.

Power is transmitted through a two-piece, tubular propeller shaft to the rear axle, which has helical reduction gears and straddle mounted pinionshaft. The axle is a semi-floating design with Timken bearings at the differential and at the wheel ends. The axle housing is a cast steel banjo type with the differential supported in a removable carrier. An I-section front axle is used. The steering gear is a Gemmer worm and sector unit.

Frame side rails are 6 in. deep and 7/32 in. thick and provide 124 in. of loading space back of the driver's seat. Front springs are 38½ in. long, 2¼ in. wide and have 10 leaves, and those at the rear are 50 x 3 in. with 12 leaves. Service brakes are 3 in. wide and act internally on 15½ in. drums on the rear wheels. The emergency brake is a contracting type, 4 in. wide and 8½ in. in diameter, mounted on the rear of the transmission. The wheelbase is 160 in.

Cast steel, hollow spoke wheels with 34 x 4 in. tires front and 34 x 6 in. rear are standard equipment. Other equipment includes electric lights and horn, tool kit, grease gun, jack, front bumper and instrument board.

GOODYEAR TIRE SALE UP

AKRON, April 1—"Business volume during the first quarter of 1925 showed a normal increase over the same period last year," President G. M. Stadelman reported at the annual stockholders meeting, March 30, of the Goodyear Tire & Rubber Co.

"Sales of tires have been up to expectations," said Mr. Stadelman, "and an increase in consumption of 20 per cent for the year undoubtedly will be recorded, on the basis of present business and prospects for the future."

WOMAN DIRECTS BODY INSPECTION AT HUPP

DETROIT, April 1—Recognizing the importance of feminine influence in the selection of automobile purchases the Hupp Motor Car Corp. has named a woman, Mrs. Calista Conwell, to have charge of final body inspection. This includes the inspection of body finish, upholstery, body hardware and general car interiors—the features which, in the opinion of the company, attract the greatest attention in womanly eyes.

Mrs. Conwell is in charge of from three to four hundred men, about fifty inspectors, and is declared to be the first woman to hold such sweeping authority in the business of car manufacturing.

Dodge Plant Sold

(*Continued from page* 635)

while other men equally well known have also figured in the talk.

During 1923 an attempt to purchase the company was made at which time the understanding was that it would form the nucleus of a combination which would include the Packard, Studebaker and Willys-Overland companies. Latterly the names of Packard and Hudson, with the possibility of purchase by General Motors, have excluded all others in connection with a change in Dodge ownership.

Denials of merger prospects have been made by heads of the Packard and Hudson companies. Alvan Macauley, president of Packard, said that so far as his company was concerned there were no negotiations contemplated looking to a merger. R. B. Jackson, president of Hudson, said he did not care to discuss the possibility of Hudson merging with anyone. Until a formal statemen was issued, he said, Hudson could not be regarded in any merger connection.

ENGLAND CONSIDERS INSURANCE

LONDON, March 23 (*by mail*)—In the House of Commons this week the Minister of Transport stated that he had received many representations on the question of compulsory liability insurance for motorists and that he had under consideration the advisability of including a clause, under which motor owners would be compelled to insure against their third-party liabilities, in the bill which is to be introduced shortly to coordinate and modify where necessary the laws relating to motor construction and use.

WILLS CONTRACT TO TIMKEN

Timken Has Ste. Claire Contract troit Axle Co. has closed a contract with Wills Ste. Claire, Inc., for the latter's entire axle requirements, both for the six and eight cylinder lines.

United Motors Cuts Prices on Armatures

Slash of 30 Per Cent to 50 Per Cent Made to Induce Return of Core—Klaxons Reduced

DETROIT, March 31—Reduction of prices on factory built Delco and Remy armatures are now in effect by United Motors Corporation, the prices ranging 30 to 50 per cent under the former, being based upon the consideration that the old armature will be turned in by the purchaser. Price lists and discounts to dealers, service stations and garages will in the future be based upon this exchange consideration.

In announcing the fixing of prices on this exchange basis the company declares that it is doing so as an inducement for the return of the core, thereby keeping the old armature out of the hands of rewinders. According to the company the new prices will greatly reduce the service charge on any electrical job where a new armature is needed.

Reduction in price on Klaxon horns is also made by United Motors, in connection with which the company is announcing a horn exchange plan, the intent of which is to avoid contrast as between service charges on horns and the new prices now announced.

New prices range so low as compared to service prices necessary in repairing an old horn that the company feels it better to avert misunderstandings by urging the exchange of the old horn for a new one.

As an instance of the reductions, the former $4 model now lists at $2.24. Service stations may make slight additional charge for detaching the old horn and installing the new. This new plan provides for a standard replacement price for each model of Klaxon horn by any authorized service station in the country.

COVERT CO. ADVANCES

BUFFALO, April 1—Covert Gear and Manufacturing Co., which was recently organized from the Covert Gear Co., will invest $400,000, to be used as working capital in the operation of its plant at Lockport, N. Y. More than 100 men are now employed in the plant, which was taken over from the old company, and it is expected that the number will be increased to 200 within a few weeks.

HARVESTER STATEMENT

NEW YORK, April 2—The 1924 annual statement of the International Harvester Co. shows net profit of $13,037,395 after deductions. Current assets are listed as of Dec. 31 at $167,651,473, and current liabilities at $19,335,885. The profit and loss surplus grew from $51,308,172 at the end of 1923 to $55,121,169 at the end of 1924.

Men of the Industry and What They Are Doing

Crane Will Enter Yacht Races

Henry M. Crane, technical assistant to the president of the General Motors Corp. and former president of the Society of Automotive Engineers, plans to sail for Scotland in June to remain there until August.

With his brother, C. H. Crane, he has designed a six meter sailing boat which he will race as a representative of the Sewanhaka-Corinthian Yacht Club in a contest against the Royal Northern Yacht Club for the Sewanhaka Cup, a trophy that has been in competition for more than 25 years. The contest will consist of a series of races on the Clyde River, the first of which will be held July 11. Mr. Crane and his brother will take two boats to Scotland, one designed by themselves and one the product of a syndicate.

Hadden Directs Velie Sales

C. W. Hadden, who joined the Maxwell Motors in 1922 as assistant to the president and later became identified with the Maxwell-Chrysler sales division, has been named general sales manager of the Velie Motors Corp., succeeding Fred E. Bradfield who recently resigned. Prior to his Maxwell connection, Mr. Hadden was engaged in the distribution of agricultural implements with the Minneapolis Steel and Machinery Co.

Mr. Bradfield's plans have not been announced. Henry S. Lord, secretary and director of sales for the Velie, has also resigned.

Stutz Appoints Col. Wall

Col. William G. Wall has been appointed consulting engineer of the Stutz Motor Car Co. of America, Inc., to collaborate with Charles S. Crawford, chief engineer. He has for many years been an official of the National Motor Car Co. as chief engineer and was for some time vice-president of the Society of Automotive Engineers. During the war he did important creative work in the development of tractor gun mounts for large army guns, and he has continued this governmental association as a member of the Ordinance Advisory Board.

Eaton Axle Promotions

J. O. Eaton, former president of the Eaton Axle and Spring Co., has been elected chairman of the board of this company. C. I. Ochs, formerly vice-president, was named president and general manager. C. S. Robie is vice-president and assistant general manager, R. C. Enos is vice-president and F. A. Buchda is secretary and treasurer.

Youngs Joins Oakland Force

O. L. Youngs is now Oklahoma City district manager for the Oakland Motor Car Co. succeeding H. E. Lewis who recently resigned. Mr. Youngs has been connected with the sales organization of Dodge Brothers for the past eight years. His Oakland territory will include the entire State of Oklahoma with portions of Texas and New Mexico.

Durkee Changes Territory

Charles S. Durkee was recently named western sales manager in charge of sales of stock products for J. H. Williams & Co., Buffalo. He has been with the Williams organization for the past 18 years and for the past two years has been in charge of the central sales district with headquarters in Buffalo.

Chanson-Hughson Reorganizes

The name of the Chanson-Hughson Co., accessory manufacturer of Chicago, has been changed to Chanson Products Corp., following the resignation of Mr. Hughson as vice-president. He will be succeeded by Frederic B. Hart as vice-president and manager of sales.

Carroll Now With Cadillac

George T. Carroll, Jr., formerly assistant to A. L. Deane, vice-president of General Motors Acceptance Corp., in charge of field activities and business development, has been appointed district manager of the Cadillac Motor Car Co. in charge of the New York territory.

Russell Represents Van Dorn

Earl A. Russell has been named Chicago district representative of the Van Dorn Electric Tool Co. of Cleveland, Ohio. His territory will comprise Indiana, Illinois, Iowa, Nebraska, Wisconsin and South Dakota.

Thomson Sails

C. S. Thomson, export manager of the Four-Wheel Drive Auto Co. of Clintonville, Wis., is leaving New York this week for a several months' trip to South America.

Wethered Goes with Durant

C. A. Wethered, for some time connected with Chevrolet in Cincinnati, has joined the staff of T. E. Jarrard, wholesale manager of Durant Motors, Inc.

Fitzgibbon Joins Stutz

V. D. Fitzgibbon, former city editor of the Muncie *Star*, has been made advertising service manager for the Stutz Motor Car Co. of America.

Wagner Promotes Gelzer

The Wagner Electric Corp. announces the appointment of J. A. Gelzer as sales manager of the automotive division of the company.

Car Makers Lead in Press Advertising

NEW YORK, April 1—Nine automobile companies are among the twenty leaders in a list compiled by the Bureau of Advertising of the American Newspaper Publishers' Association of organizations that spent the most money in 1924 on newspaper advertising.

The compilation represents only a portion of the great number of national newspaper advertisers, many of whom spent as much money as those included in the list, but the estimates are believed to have a high degree of accuracy. A portion of the compilation of estimates by the bureau is as follows. The first ten companies are according to the bureau's list and those following are organizations selected for their relation to the automobile industry:

Ford Motor Co.	$2,000,000
Victor Talking Machine Co.	1,900,000
Chevrolet Motor Car Co.	1,650,000
American Tobacco Co.	1,600,000
Liggett & Myers Tobacco Co.	1,500,000
Standard Oil Co. of Indiana	1,500,000
Calumet Baking Powder Co.	1,400,000
Wm. Wrigley, Jr., & Co.	1,250,000
Dodge Brothers	1,200,000
Paige-Detroit Motor Car Co.	1,000,000
United States Rubber Co.	750,000
Hupp Motor Car Corp.	750,000
Oakland Motor Car Co.	700,000
Buick Motor Co.	635,000
Rickenbacker Motor Co.	560,000
Willys-Overland Co.	500,000
Standard Oil Co. of Calif.	500,000
Nordyke & Marmon Co.	280,000
Boyce and Veeder Co.	220,000
Johns-Manville Co.	200,000

NEW TIRE PLANT FOR SALT LAKE

SALT LAKE CITY, March 30—The Studebaker-Wulff Rubber Co. of Ohio is erecting a half million dollar plant here at an early date. Tires, tubes and other rubber goods will be manufactured, and it is planned to employ about 200 men at the outset. The daily capacity is expected to be 500 tires and 1000 tubes. They will be sold through dealers in the territory lying between the Missouri River and the Pacific Coast.

Freight Rate Survey Followed by N. A. C. C.

(*Continued from page* 634)

distribution of rates and charges be made if it is found that some articles would move more freely under lower freight rates, while others could stand higher freight rates. The total revenue of carriers is not to be impaired, but maintained on a basis that would insure adequate service to the public. Special attention is directed in the resolution to the existing depression in agriculture and livestock. It is stated that decisions of the Interstate Commerce Commission in rate cases brought before them shall be decided with all this in view."

Plants Urge Dealers to Order Cars Now

Retailers Requested to Secure Buyers for Future Delivery

DETROIT, March 30—As a means of lessening the anticipated difficulties of meeting dealer requirements in the next several months, factories are urging dealers to greater effort in getting orders from buyers now, even though actual deliveries are not to be made until May or June. There is frank skepticism on the part of factory sales officials of meeting the second quarter demand on time unless some method of lining up this anticipated volume in advance is found.

The fact that dealers have few cars on hand to meet this expected volume of business is not laid by factories so much to lack of dealer desire to take cars and store them as to the disinclination of banks to provide financing for cars not required for the immediate market. This is a condition which is fairly general throughout the country, factories report, and is considered the principal reason why no general preparation is being made for second quarter sales.

Easier Financing

To overcome this situation the suggestion is advanced by sales executives that dealers make a special effort to line up actual orders for deliveries in the months of April, May and June so that they may present these to their banks in seeking additional credit accommodations. With this business practically assured by the orders, it is regarded as certain that many dealers will be enabled to finance car shipments now that otherwise are being held back.

The thought of the factory executives in seeking this business now is prompted by their belief that it will be impossible to handle the second quarter volume if it is all launched at the one time. Though most factories are operating now at a high rate of speed, there is considerable capacity not yet called upon. Full capacity, if it could be realized within a few days or weeks would not be sufficient to meet the concentrated quarter buying, executives point out.

Even starting now to store cars is regarded as too late to handle the full volume of business that will be forthcoming, but delays in deliveries will be reduced by at least a certain percentage and factories will be enabled to get organized just that much ahead on increased schedules. Any organization toward capacity now will make the factory position that much easier when the real heavy buying movement comes.

Shortage Will Not Be General

It is not being argued by factories that there will be a shortage of all makes of new cars by May 1, or of all models. The factory position is that certain models in all lines will probably be far behind the demand, making it necessary for buyers to wait at least several weeks for deliveries, take another model in the same line, or get an immediate delivery in another make of car.

Strenuous efforts are being made by factory branches to move cars on this basis at the present time and every effort is being made to get dealers generally lined up in this activity. Buyers are being told by retail branch salesmen that the only way to avoid delays in deliveries is by taking their cars now. As a further inducement to do business immediately buyers are told that allowances on used cars will be considerably lower when the buying peak develops.

Gallup Now Official of Bendix Brake Co.

SOUTH BEND, March 31—D. L. Gallup, who recently accepted the vice-presidency of the Bendix Brake Co. of this city, has taken charge of the plant and operations.

Mr. Gallup is a graduate of the Worcester Polytechnic Institute, and from 1917 until 1922 was connected with the Nordyke & Marmon Co. as research and experimental engineer and later consulting engineer. From 1922 until his affiliation with the Bendix company he was consultant in engineering, sales and manufacture for automobile companies.

REQUIRE EXPORT DECLARATIONS

WASHINGTON, April 2—In order to enable the Department of Commerce to compile statistics of exports by mail or parcel post to foreign countries, postmasters has just been ordered by Second Assistant Postmaster General Paul Henderson to require automobile accessory and other manufacturers where the contents of the merchandise are valued at $25 and over to fill out a postal export declaration on Department of Commerce Form No. S-250. Export declarations are only required for goods mailed for commercial purposes and not for packages addressed to private consumers.

BRITISH OUTPUT 105,000

WASHINGTON, April 2—The Department of Commerce is advised that an estimate of the British passenger car production for the year 1924, based on registration returns as well as import and export statistics, is near completion and will be shortly published. While awaiting the complete details of this estimate preliminary figures are given which show that between 105,000 and 110,000 private passenger cars, exclusive of assembled machines, were produced in Great Britain last year.

GUSTAVE FOX CO. MOVES

CINCINNATI, March 30—The Gustave Fox Co., which formerly operated three distinct plants, has moved into the entire building at Third and Race Streets, where its operations will be centered and a greater output of automobile name plates and other products will be possible.

FINANCIAL NOTES

Chicago Yellow Cab Co., reports net profits for 1924 of $2,223,929, an increase of $152,677 over the preceding year. After paying $4 per share dividends on 400,000 shares of stock outstanding during 1924 which amounted to $1,600,091.35, the surplus was increased $623,837.99, making a total net earning on the 400,000 shares of $5.56 per share for the year. The cost of cab equipment purchased by the company during the year was $1,813,286.15.

Durant Motors of Canada, Ltd., reports for the ten months ended December 31, 1924, net sales of $4,376,[illegible] and total income of $4,569,423, against $[illegible]2,475 for the year ended February 28, 1923, and an operating loss of $90,000, against an operating surplus of $85,627 in 1923. The balance sheet current assets are listed as $1,600,755, and current liabilities as $471,723.

Apco Manufacturing Co. has declared an initial quarterly dividend of 50 cents a share on the $25 par value Class "A" stock, payable April 10 to holders of record March 20. This stock formerly was classed as preferred; the change was made in January, 1925. The last dividend paid on the preferred was $2 a share on Jan. 10, 1925.

Ames-Holden Tire & Rubber Co. of Canada, reports for Dec. 31, 1924, current assets of $495,306 and total current liabilities of $135,278, leaving net working capital $360,028, against $258,906 at the end of 1923.

C. G. Spring and Bumper Co., for the six months ended Feb. 28, 1925, reports net sales of $1,587,872, against $1,358,721 in the same period last year and net profits of $68,852, against $17,297.

Hayes Wheel Co., in 1924, earned $38.91 a share on preferred stock, which was issued in March, 1924, and $3.16 on the common stock, against $6.61 on the common in 1923.

Brockway Motor Truck Corporation reports for 1924 net earnings of $380,699, against $408,451 the previous year, and gross sales of $4,927,766, against $4,121,321.

Dunlop Rubber Co., Ltd., reports for 1924 net income of £1,500,151, leaving surplus for the year, after dividends and general reserves of £525,151.

Murray Body Corp.—March 25 the New York Stock Exchange admitted to the list 81,124 shares of additional no par common stock.

START YOSEMITE ROAD PROJECT

SAN FRANCISCO, April 1—Work on the greatest road improvement campaign any of the national parks ever have had has been started in Yosemite National Park, California, with $404,000 actually appropriated and $436,000 carried in legislation approving the expenditure of the latter amount. The program for this year contemplates the paving of El Portal and the Yosemite Valley road, which when completed will cost approximately $640,000, while work is also being started on the principal mountain roads in the valley, for whose reconstruction $200,000 is available. Involved in this is the improvement of the Big Oak Flat, Wawona and Mariposa Big Tree Grove roads.

Novel Service Meet Held at Lycoming

Engine Company Arranges Show of Vehicles Using Its Power Plants

WILLIAMSPORT, PA., March 27—An unusual meeting was held today at the plants of the Lycoming Manufacturing Co. when distributors and dealers of cars and trucks using Lycoming engines met in a service convention here.

A novel feature arranged in conjunction with this meeting was an automobile show in a local armory devoted entirely to the exhibit of the Lycoming company's products and of cars and trucks regularly equipped with its engines.

This was a local show open free to townspeople, 600 of whom attended the show opening last evening. The exhibit included two eight-cylinder Gardner cars, two four-cylinder cars of the same make, two Apperson four-door sedans with eight-cylinder engines, three eight-cylinder Elcar models, two Auburn eight-cylinder sedans, one Republic, three Stewart and four International trucks fitted with various types of bodies. An unusual demonstration of the methods employed in assembling the eight-cylinder Lycoming engine was a feature of the exhibit, which attracted much attention. The four-cylinder and the new six-cylinder Lycoming engines also were shown.

During the day groups of dealer and distributor representatives of the car and truck manufacturers were shown through the entire machine shop and foundry operated by the company and afterward assembled for dinner at the Lycoming Hotel.

Following the dinner there were talks on service methods, lubrication and constructional features of the Lycoming engine and on the carbureter and ignition equipment generally used on these engines. These talks were given by representatives of the Lycoming, Wheeler & Schebler, Remy Electric and Vacuum Oil companies. They were followed by questions and answers relating to various problems encountered by dealer and service representatives in connection with service work.

It was agreed generally that the meeting was of considerable value to all concerned, since it afforded not only an opportunity for service men to see the manufacturing methods used by this company, but enabled these men to meet in person individuals in the Lycoming organization who are in a position to give assistance when this is required in connection with service work.

Locomobile Raises Prices on Series 48

BRIDGEPORT, March 30—An advance in price of the Locomobile Series 48, ranging from $50 to $60, has been made by the Locomobile Company of America. The increase is occasioned by the fitting of 35 x 6.75 balloon tires in place of the 35 x 5 high pressure cords formerly used, it is stated.

The following schedule shows the old and new prices:

	Old Price	New Price
4-pass. sportif touring	$7,400	$7,460
7-pass. touring	7,400	7,460
5-pass. victoria sedan	9,990	10,050
7-pass. brougham	9,990	10,040
7-pass. enclosed drive limousine	9,990	10,050
7-pass. cabriolet	10,250	10,300

Packard in Half Year Earned Net $2,954,745

DETROIT, March 31—Earnings of Packard Motor Car Co. for the six months ending Feb. 28, the first half of the company's fiscal year, were $2,954,745, equal to $1.08 a share on the common stock after preferred dividends. This compares with $2,431,419, or 85 cents a share for the same period last year. Current assets were $30,250,935 and current liabilities, $3,484,671. Company holdings of cash and securities totaled $17,218,030. Inventories were $8,606,110.

Referring to the company's showing for this six months period, President Alvan Macauley said: "Though the company's net earnings for the first six months are satisfactory, the figures do not reflect the actual prosperity. Orders are heavy, some closed models being sold up for four months in advance. Production is increasing steadily and the company is now turning out more cars than at any previous time in its history, all of which is in response to current demand.

"Unless something unusual and unexpected develops, the next six months will be considerably better than the first half of the company's fiscal year, indicating a favorable outlook for the twelve months earnings."

New Ford Plan

(*Continued from page* 637)

B. Ford, president, on the used car guarantee policy, he says:

"Every used Ford car represents so much unused transportation and is of value to someone. The Ford dealer through his position and intimate knowledge of the car certaintly is the best judge as to the value of this transportation and the best to determine a price on the mileage the car may yet be expected to deliver. With this advantage, the Ford dealer is prepared to give his used car customers benefits not likely to be obtained elsewhere.

"If reconditioning is necessary, he has the work done by trained Ford mechanics, using improved equipment and genuine Ford parts, and with these economies and advantages he is able to offer the used car to the purchaser at low cost and with a guarantee covering its mechanical fitness."

METAL MARKETS

It would be overstating steel market conditions to say that automotive demand is the only bright spot left. It isn't a bright spot because prices obtained are far from pleasing to producers, but it certainly furnishes the only worthwhile source of steel orders these days.

Demand for full-finished automobile sheets has even turned urgent in some cases where production schedules in automotive plants were broadened without sufficient advance notice to the purchasing department to prepare for corresponding deliveries of sheets. Not so very long ago when automotive consumers wanted steel as badly and quickly as they do now, premiums were lurking around the corner, but conditions are different today. Many of these requests for rush shipments of full-finished automobile sheets apply to orders booked at 4.40 to 4.50c. base prices. It is quite possible, however, that the improved demand will before long cause the market to steady at the 4.60c. base level which is still the price of some rollers.

Aside from automotive steel specialties, the market is in a more demoralized state than it has been in some time. Commitments carrying slightly higher contract prices than those now prevalent in the open market are simply ignored, and fresh orders placed in their stead at the lower levels. The sanctity of contracts is still an unfulfilled dream, the only binding contract being the one accompanied by actual specifications and shipping instructions.

At one time it looked as though the steel industry might make up in 1925 for other shortcomings by larger sales of structural steel, but although considerable structural steel tonnage is still on fabricators' books, the outlook for active building demand is marred by more and more labor squabbles.

The steel industry is striving hard to put some backbone into the flabby price structure, but in the face of dwindling orders and a rapid shrinkage of the backlog, this is a difficult task. Sheet rollers apparently have no difficulty in obtaining all the sheet bars they need at $37, but some of the bar mills talk $39 for second quarter, in a desperate effort to prevent the price from slipping further. The problem of curtailing operations is fast becoming a live one, and such a move portends a steadying of prices rather than further weakening.

Pig Iron—More furnaces are going out of blast in response to the lack of interest shown by melters, many of whom still believe that the market will record further dips.

Aluminum—Offerings and arrivals of European aluminum are very light. The new low prices recorded in the copper market exert a restraining influence on aluminum because of the competition of the two metals in electrical use. Tightness of supplies continues to feature the market for secondary metal.

Copper—The recent slump in the price of the red metal is attributed to London bears who have been pounding the market for some time. At the declines there was very fair absorption of offerings by domestic consumers.

Tin—This metal seems to be holding its own.

Lead—Storage battery makers are buying more actively at the lower price levels that have recently come through. The market, however, is fairly easy rather than weak.

Calendar

SHOWS

April 1-17—Sydney, Australia, Royal Agricultural Show. Embraces automobile exhibits.

April 8-14—Bandoeng, Batavia, automobile show under auspices of Netherlands Indies Jaebeurs Fair Association.

April 22-May 7 — Melbourne, Australia, International Automobile Show, under the auspices of the Chamber of Automotive Industries, in conjunction with the Royal Automobile Club of Victoria.

May 20-23—Detroit, Second Annual Automotive Maintenance Equipment Show, General Motors Building, conducted by the National Automobile Chamber of Commerce, with cooperation of the Motor and Accessory Manufacturers Association, National Automobile Dealers Association, Society of Automotive Engineers, Automotive Equipment Association, Automotive Electric Association and the Automotive Manufacturers Association, Sam Miles, manager.

Sept. 21-26—London, England, Annual Cycle and Motorcycle. Show under auspices of the British Cycle and Motorcycle Manufacturers and Traders Union, Ltd.

Oct. 8-17 — London, Olympia passenger car show.

Oct. 29-Nov. 7—London, annual truck show.

RACES

April 30—Fresno, Cal.

May 11—Charlotte, N. C.

May 30—Indianapolis.

June 13—Altoona, Pa.

June 20—Baltimore, Washington Speedway, Laurel, Md.

July 26—Paris, Montlhery Track, French Grand Prix.

Sept. 7—Altoona, Pa.

Sept. 30—Fresno, Cal.

Oct. 10—Baltimore-Washington Speedway, Laurel, Md.

Oct. 24—Charlotte, N. C.

Nov. 26—Los Angeles.

CONVENTIONS

May 6-9—Ninth annual meeting of the American Gear Manufacturers Association at William Penn Hotel, Pittsburgh.

May 20-23—Detroit, General Motors Building, National Automotive Service Convention conducted by the National Automobile Chamber of Commerce with the cooperation of Motor and Accessory Manufacturers Association, National Automobile Dealers Association, Society of Automotive Engineers, Automotive Equipment Association, Automotive Electric Association and Automotive Manufacturers Association.

June 22-27—Summer convention of the Automotive Equipment Association at the Broadmoor Hotel, Colorado Springs, Colo.

S. A. E. MEETINGS

National

April 29-30—Tractor meeting in Chicago.

June 15-19 — Summer meeting of the Society of Automotive Engineers at White Sulphur Springs, W. Va.

Sept. 15-16—Production meeting and exhibition.

Sept.—Automotive Transportation meeting.

Nov. — Service Engineering meeting.

Sectional

April 7—Buffalo Section, Transportation meeting.

April 9—Indiana Section, J. H. Hunt, Electrical Instruments for Automotive Research.

June 15-19—Summer meeting of the Society of Automotive Engineers at White Sulphur Springs, W. Va.

Packard Plans Again for Selling Contest

DETROIT, April 1—Packard Motor Car Co. will stage its second contest for master salesman honors during the months of June, July and August, the reward being the naming of 125 victors as master salesmen and bringing them to Detroit as the guests of the company for a three-day outing. The rules of the contest are similar to those of last year, except that the master salesman degree will also be given to the 25 best used car salesmen in the entire retail organization.

The contest proper is for all retail salesmen in the Packard dealer organization. Quotas according to the sales possibilities in each territory are set per individual, and the winners are those who stand highest with respect to their quotas. In addition to the honorary degree, the winners get an insignia typifying their achievement. The Detroit visit consists almost entirely of a three day play period, the expense of which is borne by the company.

Repetition of the success recorded last year will in all probability result in the establishing of the contest as a permanent feature of the company's merchandising relation with its retail organization.

JUDGMENT AGAINST KELLY TRUCK

SPRINGFIELD, March 30—Authority has been granted to Pearl A. Lewis, receiver of the Kelly-Springfield Motor Truck Co. in common pleas court by Judge Frank M. Krapp to settle the claim of the Hares Motors, Inc., of New York City, amounting to approximately $672,492.42 for $20,000. An entry authorizing the settlement of the claim was filed in court Saturday afternoon.

The receiver in his report in the case of the Bankers Trust Co. of New York City against the Kelly-Springfield Motor Co., explains that the Hares Motors, Inc., began suit some time before the action of the trust company. The claim relates to sales, orders, etc.

Lewis was authorized to make the settlement with E. S. Hares for the Hares Motors, Inc.

AUTO TAX REVENUE OFF IN FEBRUARY

WASHINGTON, April 2—Internal revenue collections from the automotive industry for the month of February, 1925, amounted to $7,279,300.94, which is $2,577,062.07 less than the amount collected in February, 1924, when the total was $9,856,363.01, it is announced here by the Bureau of Internal Revenue.

It is also shown that the collections from the automotive industry during the eight-month period from July 1, 1924, to Feb. 28, 1925, was only $76,488,470.07, as compared with the collection of $104,622,648.51 in the eight-month period from July 1, 1923, to Feb. 29, 1924, or a loss of $28,134,178.44.

DEFEND PRIVATE COAL CAR BAN

WASHINGTON, April 1——The injunction of the Interstate Commerce Commission against more than 100 industrial corporations, prohibiting the use of privately owned coal cars for the transportation of bituminous coal, is to be defended in the courts, the commission has announced by filing its answer in the United States District Court at Philadelphia. The order is fully justifiable by evidence heard before the commission, the answer declares. In the original suit the Ford Motor Co. was one of the leading corporations affected.

Tire and Tube Exports Good in February

WASHINGTON, April 2—Over 105,000 automobile casings were exported by the United States in February, as compared with 112,000 in January, the Automotive Division reports, showing that the tire trade is holding up steadily.

Exports of automobile inner tubes declined in about the same ratio from 93,000 in January to 88,000 in February, and solid tires from 8326 to 7992. The average unit value per casing in February was $11.58, per inner tube $1.98, and per solid tire $25.50, a decline as compared to January for casings and solid tires and an increase from $1.82 in the case of inner tubes.

The chief markets for casing were Argentina, 15,454; the United Kingdom, 10,983; Uruguay, 7325; Brazil, 5259; Cuba, 5097; Australia, 5013; Strait Settlements, 4907; Philippine Islands, 4098; Mexico, 4035, and Belgium, 3482.

ONONDAGA DOCKS ON COAST

LOS ANGELES, March 30—The steamer Onondaga, operated by the Ford Motor Co., arrived at Los Angeles harbor a few days ago, initiating a new cargo service between the Atlantic and Pacific coasts in the interests of the Ford company. The Onondaga was loaded with a large shipment of Ford parts and accessories to be used in the local assembling plant. Ford plans are operated in Los Angeles, San Francisco, Portland and Seattle, and the visit of the Onondaga is accepted here as indicative of exclusive water instead of rail shipments in the future. It has been the custom for some time of motor truck dealers here representing Atlantic seaboard factories to ship chassis by water and as a consequence there has been a material reduction in the use of railroad cars for this purpose.